

# ECONOMIC AND PLANNING SYSTEMS

## Final Report

# GROWTH INDUCING IMPACTS ANALYSIS OF TRI-VALLEY WASTEWATER AUTHORITY EXPORT CAPACITY EXPANSION

Prepared for:

Tri-Valley Wastewater Authority

INSTITUTE OF GOVERNMENTAL  
STUDIES LIBRARY

SEP 12 1990

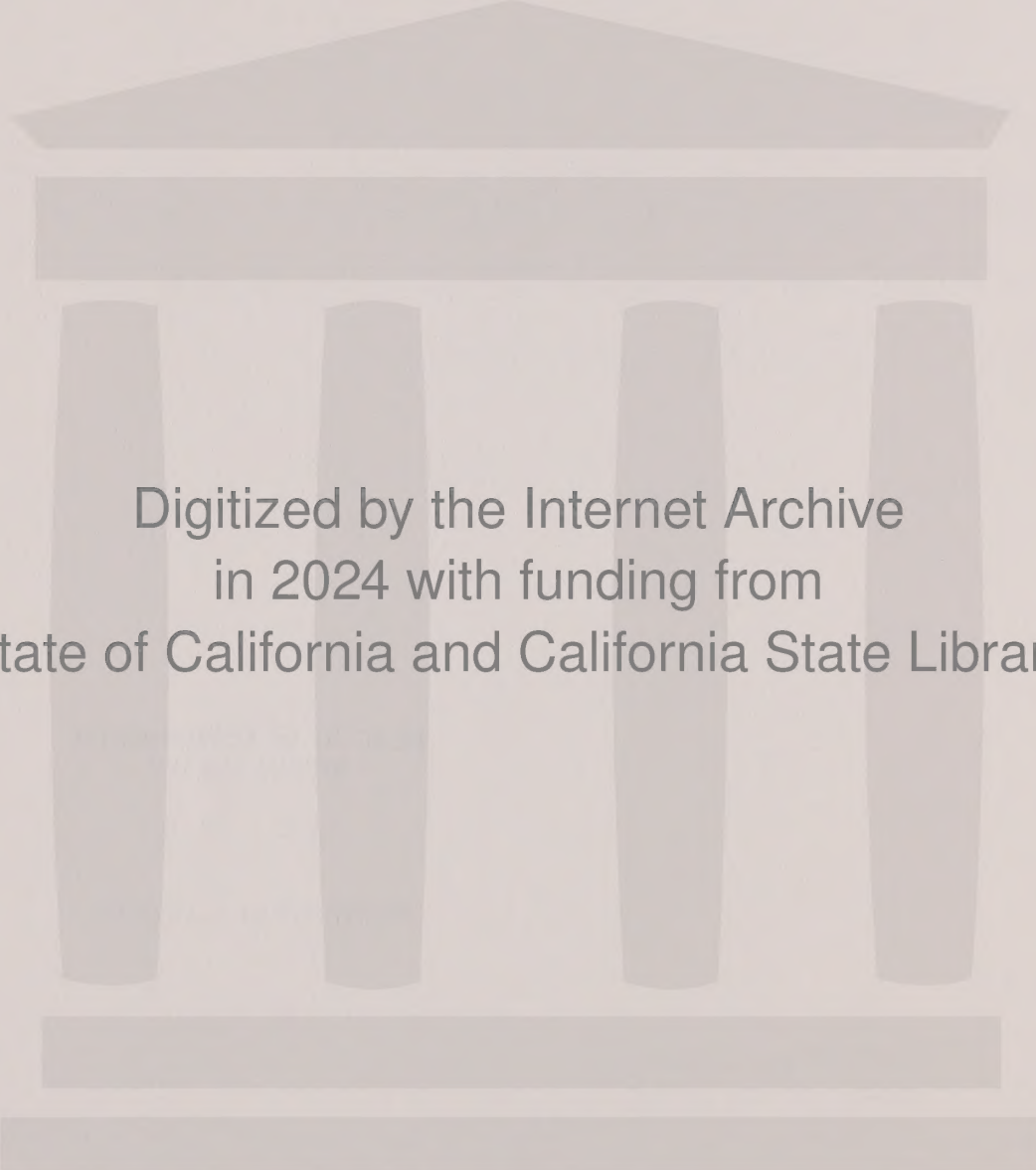
UNIVERSITY OF CALIFORNIA

Prepared by:

Economic and Planning Systems, Inc.  
Berkeley, California

April 1990

EPS #713



Digitized by the Internet Archive  
in 2024 with funding from  
State of California and California State Library

<https://archive.org/details/C124904553>

# TABLE OF CONTENTS

---

	<u>Page</u>
EXECUTIVE SUMMARY	<i>i</i>
I. INTRODUCTION	1
BACKGROUND AND PURPOSE OF REPORT	1
LAND USE FORECASTING METHODOLOGY	1
ORGANIZATION OF REPORT	3
II. RELATIONSHIP BETWEEN GENERAL PLANS AND GROWTH	4
III. RELATIONSHIP BETWEEN INFRASTRUCTURE AND GROWTH	5
REFERENCES	7
IV. PROJECTED UTILIZATION OF EXISTING SEWER CAPACITY	9
SUMMARY OF CONCLUSIONS	9
Projected Use	9
Allocated Use	12
SEWER ALLOCATION POLICIES	12
Livermore	12
Pleasanton	12
DSRSD	13
DEVELOPMENT PROJECTIONS	13
Pleasanton	14
Livermore	14
Dublin San Ramon Services District	17
V. FORECAST OF LAND USE POTENTIAL AND SEWER CAPACITY REQUIREMENTS UNDER ALTERNATIVE GENERAL PLANS SCENARIOS	19
LAND USE POTENTIAL UNDER EXISTING AND PROSPECTIVE GENERAL PLANS	19
Land Use Update Methodology	19
Land Use Potential	21





## LIST OF FIGURES AND TABLES

PROJECTED DEVELOPMENT UNDER ALTERNATIVE GENERAL PLANS	25
Constraints Analysis	27
Constrained Development Potential	27
A Third Scenario: Constrained General Plans	30
SEWAGE EXPORT REQUIREMENTS OF ALTERNATIVE GENERAL PLANS SCENARIOS	32
 <b>VI. LAND USE POLICY IMPACTS AND MITIGATIONS</b>	 35
IMPACTS	35
Existing General Plans Scenario	35
Prospective General Plans Scenario	36
Constrained General Plans Scenario	36
MITIGATIONS	37
 <b>APPENDIX A</b>	
Growth Projections and Projected Sewer Capacity Utilization By Jurisdiction: 1989 - 2000	
 <b>APPENDIX B</b>	
General Plan Land Use Potential For The Entire Tri-Valley	



## LIST OF FIGURES AND TABLES

---

	<u>Page</u>
Figure I-1 -- Study Area Map	2
Table IV-1 -- Remaining Sewage Export Capacity and Projected Year Capacity Is Fully Utilized Livermore, Pleasanton and DSRSD	10
Table IV-2 -- Summary of Projected Sewer Use and Remaining Capacity Pleasanton, Livermore and DSRSD 1989-2000	11
Table IV-3 -- Residential Development Projections (Dwelling Units) Livermore, Pleasanton and DSRSD 1989 to 2000	15
Table IV-4 -- Employment Growth Projections Livermore, Pleasanton, Dublin and San Ramon 1990 to 2000	16
Table V-1 -- Summary of General Plan Land Use Potentials Existing General Plans and Prospective General Plans Scenarios Total Tri-Valley and TWA Service Area	22
Table V-2 -- Land Use Potentials for the Existing General Plans Scenario By Analysis Area TWA Service Area	23
Table V-3 -- Land Use Potentials for the Prospective General Plans Scenario By Analysis Area TWA Service Area	24
Table V-4 -- Population, Dwelling Unit and Employment Estimate Current and General Plan Buildout TWA Service Area	26
Table V-5 -- Tri-Valley Gateway Traffic Analysis Tri-Valley's Share of Gateway Capacity Assuming Pass-Through Trips Remain at the 1989 Percentage	28
Table V-6 -- Projections of Tri-Valley Employment and Population Potential, Given Commutation Constraints Buildout of Existing General Plans and Prospective General Plans Scenario TWA Service Area	29





## LIST OF FIGURES AND TABLES (continued)

---

	<u>Page</u>
Table V-7 -- Projections of Tri-Valley Employment and Population Potential Summary of Results for Existing General Plans and Prospective General Plans TWA Service Area	31
Table V-8 -- Additional Sewage Export Requirements Given Projections of Employment and Population Potential TWA Service Area	33
Table V-9 -- Additional Sewage Export Requirements Given Projections of Employment and Population Potential For Each Jurisdiction in the TWA Service Area	34
Table VI-1 -- Impact of Constrained General Plans Scenario on Employment Growth Assuming a Pro-Rata Distribution of Future Job Growth by Jurisdiction in the TWA Service Area	38



# EXECUTIVE SUMMARY

---

## I. INTRODUCTION

- In 1989 the California Superior Court ruled that the environmental impact report on the Long Range Wastewater Management Plan for the Livermore-Amador Valley required additional analysis to meet CEQA requirements. The court mandated that the growth-inducing impacts section of the EIR consider alternatives with potentially lower impacts on growth than those associated with the existing General Plans in the service area, and identify mitigations to potential impacts.
- The purpose of this report is to respond to the requirement of the superior Court by providing:
  - Updated land use data and forecasts that can serve as the basis for supplementary impact analyses, including a lower impact scenario;
  - A projection of when remaining sewer capacity will be fully utilized;
  - A description of the nature of General Plans and their relation to growth;
  - A review of academic studies and other analyses of the growth inducing effects of infrastructure improvements;
  - An initial analysis of the land use policy impacts of expanding sewer capacity to accommodate alternative General Plans; and,
  - A description of possible mitigations to the identified land use policy impacts.
- The land use forecasts are based on a comprehensive land use data base updated by Economic and Planning Systems (EPS).
- The data were used to estimate the land use capacities, and sewage export requirements, embodied in existing and prospective General Plans.
- Forecasts of future development and sewerage needs were then made considering the labor force and transportation constraints affecting the Tri-Valley Wastewater Authority (TWA) service area.
- The resulting "constrained" development forecasts provided the basis for evaluating the land use policy impacts of alternative General Plan and sewer expansion scenarios.





## II. RELATIONSHIP BETWEEN GENERAL PLANS AND GROWTH

- General Plans set forth goals, objectives and policies to guide decisions about the future growth of local jurisdictions. The development potentials established by land use policies provide, in turn, the basis for infrastructure and public facilities needs, including sewer, water and road systems.
- State law recognizes that General Plans are evolving documents, and that the blueprint for a City's growth must be continuously reevaluated and updated to reflect changing conditions and objectives.
- The Tri-Valley area has experienced continuous change over the last decade, from both the land use policy and development perspectives. Based on current planning activities in the Tri-Valley, it is evident that land use policies in the area will continue to evolve.
- These policy changes are occurring independent of sewer capacity considerations. Sewer capacity constraints could, however, limit the ability of local jurisdictions to modify land use policies to reflect changing economic conditions and community goals.

## III. RELATIONSHIP BETWEEN INFRASTRUCTURE AND GROWTH

- The literature on the growth effects of infrastructure has been produced principally by two academic and professional disciplines: urban planning and regional economics. Planning literature generally holds that infrastructure may determine the location of development, but not stimulate the economic demand for it. The regional economic literature takes a more rigorous statistical approach to the question and is more ambiguous in its conclusions.
- In sum, the following conclusions may be drawn from the literature:
  - The lack of adequate infrastructure is a constraint to economic development.
  - The provision of infrastructure can have a major effect on the location and timing of development within a region.
  - Public investment in infrastructure is an accepted means of attempting to foster economic development. Empirical research yields ambiguous conclusions as to the effectiveness of such investment.
  - It is generally held that infrastructure, by itself, is not sufficient to induce economic growth; other favorable economic factors must be present, and are generally more important.
  - Certain types of infrastructure, notably transportation and communications, may have a more stimulating effect on growth than other types.



#### **IV. PROJECTED UTILIZATION OF EXISTING SEWER CAPACITY**

- The analysis forecasts development and the utilization of remaining sewer capacity in each TWA member agency, Livermore, Pleasanton and Dublin San Ramon Services District (DSRSD). A forecast was also made of when all remaining sewer capacity will have been allocated in anticipation of actual development.
- Remaining sewage export capacity and the year capacity is projected to be fully utilized are presented below for each jurisdiction:

JURISDICTION	REMAINING CAPACITY	YEAR FULLY UTILIZED
LIVERMORE	3.229 MGD	2000
PLEASANTON	2.611 MGD	1997
DSRSD	0.816 MGD	1997

- Sewer allocations precede actual development and utilization by two to three years in Pleasanton and Livermore. DSRSD allocates capacity on a first come, first served basis at the time final maps area filed.
- As a result of allocation policies, it has been estimated that sewer capacity will be fully allocated, leaving no additional capacity for subsequent submittals, in 1997 or 1998 in Livermore, 1994 or 1995 in Pleasanton, and 1996 in DSRSD.

#### **V. FORECAST OF LAND USE POTENTIAL AND SEWER CAPACITY REQUIREMENTS UNDER ALTERNATIVE GENERAL PLANS SCENARIOS**

- Land use potential of existing and prospective General Plans was estimated based on a comprehensively updated database with information on existing development, planned projects, and vacant land designated for urban uses in the TWA service area and the Tri-Valley.
- The Prospective General Plans Scenario reflects existing General Plans plus major General Plan amendments that are currently in the planning stages, including north Livermore, Pleasanton Ridge, West Dublin, East Dublin, and the Tassajara and Dougherty Valleys.





- The land use potentials within the TWA service area and the larger Tri-Valley that are indicated by land use policies, assuming full buildout at allowable densities, are estimated to be:

SCENARIO/AREA	POPULATION	EMPLOYMENT
<u>EXISTING GP</u>		
TWA SERVICE AREA	228,000	259,000
TRI-VALLEY	322,000	315,000
<u>PROSPECTIVE GP</u>		
TWA SERVICE AREA	349,000	255,000
TRI-VALLEY	442,000	312,000

- The actual development that occurs under any given set of land use policies depends upon a host of economic, political and social factors. A key issue that will affect development in the TWA service area is the ability to provide labor to support job growth.
- To the extent that workers must be imported from outside major employment centers, the imbalance between employment and housing potential can strain transportation infrastructure. At some point, when both housing and transportation resources are used to capacity, the inability to provide sufficient labor resources will constrain further employment growth.
- Actual development in the TWA service area and the Tri-Valley was projected based on an analysis of labor force and transportation constraints under existing and prospective General Plan policies.
- The results of this analysis suggest that, under both scenarios, there is considerably more land designated for commercial/industrial uses than is likely to be developed, given the residential potential in the General Plans and the future capacities of the transportation network.



- Total projected population and employment, and the "constrained" employment -- that is, the potential of land designated for employment-generating uses that is not likely to be developed as planned -- are shown below.

#### CONSTRAINED DEVELOPMENT POTENTIAL ANALYSIS

SCENARIO	POPULATION	EMPLOYMENT	CONSTRAINED EMPLOYMENT
EXISTING GP	228,000	160,000	99,000
PROSPECTIVE GP	349,000	209,000	47,000

- The analysis above suggests the basis for an additional scenario which represents a lower level of development and, potentially, growth impacts than the other two scenarios. This scenario, the "Constrained General Plans Scenario", represent the same population (228,000) as the Existing General Plans Scenario, but lower employment potential equal to the number of jobs that could be accommodated given labor force and transportation constraints (160,000).
- The Constrained General Plans Scenario represents one of many possible policy scenarios that balance employment, housing and transportation potentials. It would result in employment growth well below the levels indicated in existing General Plans, and would have a number of land use impacts.
- The sewage export capacity required for each of the three scenarios is summarized below. Estimates by jurisdiction are provided in **Section V** of this report.

SCENARIO	EXPORT CAPACITY NEEDED	EXISTING CAPACITY	EXPORT EXPANSION NEEDED
EXISTING GP	36.36	19.72	16.64
PROSPECTIVE GP	45.80	19.72	26.08
CONSTRAINED GP	29.46	19.72	9.74

Note: All figures in Million Gallons Per Day (MGD)





## VI. LAND USE POLICY IMPACTS AND MITIGATIONS

- This section evaluates the land use policy impacts associated with alternative General Plan and sewer expansion scenarios. Land use policy impacts, in this instance, refers to the effects of alternative land use policies on the ability of urban systems to develop and function as intended.
- The land use patterns that result from General Plan policies and infrastructure capacities will, in turn, generate other impacts, including traffic and transportation, air and water quality, and noise. These impacts will be addressed in a supplemental EIR on the proposed sewer expansion.
- **IMPACTS.** The land use impacts of the project alternatives stem from the relationship between employment-generating and residential uses that could be developed in each instance. As shown in the foregoing sections of this report, the amount of residential land designated, together with the planned transportation system, will not support the levels of employment allowed under General Plan policies.
- The imbalance between employment and housing has a variety of impacts. The principal impacts under each land use/sewer capacity scenario are summarized below, and described in more detail in the report text.
- EXISTING GENERAL PLAN SCENARIO. Under this scenario, land designated for commercial/industrial uses that theoretically would support about 100,000 employees would be unlikely to be developed as designated, due to labor force and transportation constraints. The land use impacts associated with this scenario include:
  - Lack of housing affordable to local workers.
  - Lack of sufficient labor force to support economic and fiscal development envisioned in General Plans.
  - Overtaxing of highway system to support commute.
  - Commitment of land to untenable pattern of development.
  - Possible financial jeopardy to assessment districts.
  - Disproportionate allocation of economic growth to communities that have already experienced substantial growth.



- PROSPECTIVE GENERAL PLANS SCENARIO. The Prospective General Plans Scenario would, in effect, represent a partial mitigation of the Existing General Plans Scenario. The planned major additions to the housing supply would allow an additional increment of economic development to occur, reducing constrained employment from almost 100,000 jobs to about 47,000 jobs.

While the Prospective General Plans Scenario partially mitigates the impacts described above, it still results in an imbalance between employment and housing with all the attendant consequences. Therefore, the impacts of this scenario are essentially the same as those described for the Existing General Plan. The only difference is that it would allow a higher level of economic development to occur prior to reaching the labor force and transportation constraints.

- CONSTRAINED GENERAL PLANS SCENARIO. The constrained General Plans Scenario would result in a balance between employment and housing, commensurate with the capacity of the transportation network. However, this scenario would represent a significant retrenchment from existing General Plan employment potentials and would have a number of land use impacts that raise important functional and equity issues. The impacts associated with this scenario include:
  - Disproportionate allocation of economic growth and fiscal benefits, resulting in either the undermining of existing assessment districts, or the curtailment of growth opportunities in less developed cities.
  - Lack of flexibility in land use policies to allow more economic development.
  - Potential for further diminution of economic potential as a result of continued fiscal competition.
- MITIGATIONS. The Court has required that a variety of mitigation measures be discussed in the EIR. In requiring this discussion, the Court has recognized that TWA itself may not have the authority to implement the mitigation measures, but must nevertheless present them for public review.
- Mitigation of the impacts described above depends on balancing land uses and transportation infrastructure. Accomplishment of this task requires that the issues of growth be addressed at the level where functional interrelationships are determined. This means establishing land use and infrastructure policy at the subregional level (i.e., for the Tri-Valley area), and having some political means to implement effective policies.
- Some possible actions that could be considered to mitigate land use policy impacts are described below. Eventually, the potential mitigation measures will need to be developed into specific programs that can be implemented and monitored to meet CEQA requirements. Further evaluation and hearings would be required before implementation of any of these possible actions.





- The measures that have been identified to date include the following.
  1. *Establish a growth monitoring and management program* that coordinates land use and infrastructure planning on a subregional level to provide a balance among land uses, compatible with transportation and other infrastructure capacities. Elements of this program might include:
    - Develop coordinated goals and standards for Tri-Valley growth to be implemented and enforced through adoption in the General Plans of governmental entities within the TWA service area;
    - Rezone commercial/industrial land to residential to balance land uses and allow more economic growth than is likely to occur under existing or prospective General Plan policies.
    - Promote housing development that reflects the income distribution of the local employment base.
    - Develop a Master Infrastructure Financing Plan that identifies funding programs that can be supported by feasible land use development, and that pools the resources of multiple jurisdictions.
    - Encourage Transportation Systems Management (TSM) measures and transit improvements that would increase the capacity of the transportation system beyond projected levels.
  2. *Create a joint powers authority or other governmental body* capable of addressing growth issues and policy at the subregional level, and implementing the above mitigation measures.



# **I. INTRODUCTION**

---

## **BACKGROUND AND PURPOSE OF REPORT**

In early 1989, the California Superior Court found that the EIR on the Long Range Wastewater Management Plan for the Livermore-Amador Valley required additional analysis to meet CEQA requirements on several counts, although it was adequate in other areas. The court mandated that the growth-inducing impacts section of the EIR consider alternatives with potentially lower impacts on growth than those associated with the existing General Plans in the service area, and identify mitigations to potential impacts.

The purpose of this report is to respond to the mandate of the court by providing:

- Updated land use data and forecasts that can serve as the basis for supplementary impact analyses, including a lower impact scenario;
- A projection of when remaining sewer capacity will be fully utilized;
- A description of the nature of General Plans and their relation to growth to provide a context for supplementary growth inducing impacts analyses;
- A review of academic studies and other analyses of the growth-inducing effects of infrastructure improvements;
- An initial analysis of the land use impacts of expanding sewer capacity to accommodate alternative General Plans; and,
- A description of possible mitigations to the identified land use impacts.

## **LAND USE FORECASTING METHODOLOGY**

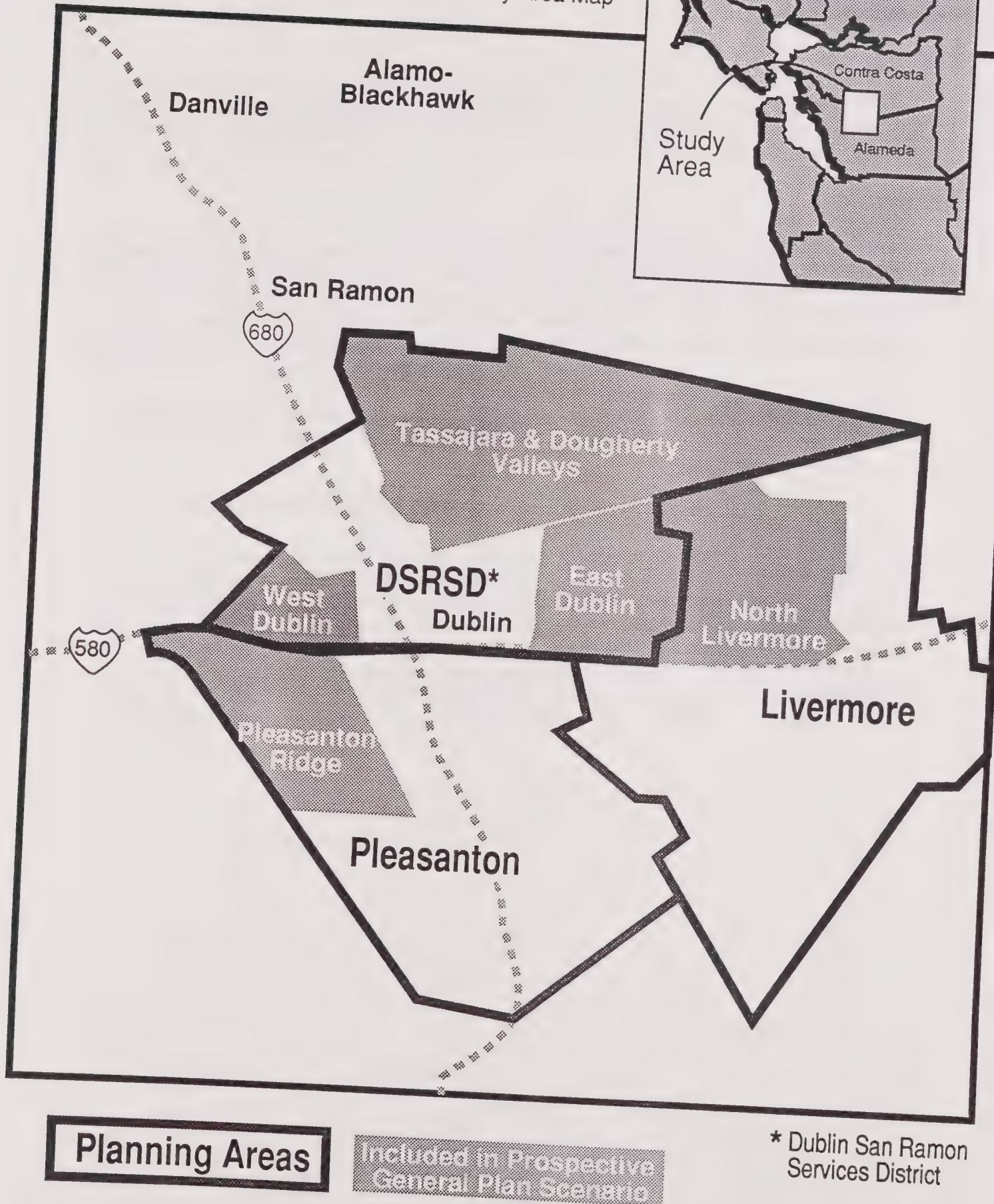
The land use forecasts began with a comprehensive update of the base data depicting existing development and General Plan capacities within the Tri-Valley Wastewater Authority (TWA) service area. In the course of preparing the data for the TWA service area, land use information on the entire Tri-Valley was updated. These data were compiled from the most current sources available, updated by Economic and Planning Systems (EPS) and verified with staff of member agencies.

The Tri-Valley is comprised of the Cities of Livermore, Pleasanton, Dublin, San Ramon, and Danville as well as the unincorporated areas of Alamo-Blackhawk and Tassajara-Dougherty Valleys in Contra Costa County, and the Livermore-Amador Valley planning unit in Alameda County. The TWA Service Area, outlined in **Figure I-1**, includes the southern part of San Ramon, Tassajara-Dougherty Valleys, Dublin, Pleasanton, and Livermore and the unincorporated areas surrounding these cities.





Figure I-1  
Study Area Map







Utilizing the updated land use data, base estimates were made of the land use capacity, or development potential, implied by existing General Plan designations and allowable densities. A similar estimate was made for "prospective" General Plan policies, which include major General Plan amendments that are in various stages of planning in the service area.

A forecast was then made of the development that potentially could occur considering labor force and transportation constraints affecting the service area. This constrained analysis provided the basis for evaluating the land use impacts, and possible mitigations, of sewer capacity alternatives to accommodate existing and prospective General Plans. It also provided the basis for a lesser impact project scenario, which was defined as the existing General Plan capacities, less the employment potential that would be constrained by labor force availability and transportation capacity.

The methodologies used in updating the land use data base and forecasting land use impacts are described in more detail in the appropriate sections of the report.

## ORGANIZATION OF REPORT

**Section II** of this report discusses the relationship between General Plan policies and growth. A summary of the literature on the growth inducing impacts of infrastructure is presented in **Section III**. **Section IV** presents a projection of when remaining sewer capacity will be fully utilized. In **Section V**, land use forecasts of existing and prospective General Plans are made, with and without labor force/transportation constraints. These forecasts yield a lower impact scenario, which corresponds to the constrained development potential of existing General Plans. Finally, **Section VI**, evaluates the land use impacts under the three alternative scenarios and identifies potential mitigation measures.



## II. RELATIONSHIP BETWEEN GENERAL PLANS AND GROWTH

---

General Plans set forth goals, objectives and policies to guide decisions about the future growth of local jurisdictions. These policies must, by law, take account of existing and projected economic and social conditions, as well as the desires of the community. As such, General Plans embody a community's understanding of existing conditions and its aspirations for the future.

General Plan law requires that all of the elements of the General Plan be consistent with one another. The land use policies in the General Plan define the amount, location, intensity and character of development that may occur. The development potentials established by land use policies provide, in turn, the basis for infrastructure and public facilities needs, including sewer, water and road systems. Plans for these facilities must reflect the growth potential of General Plan land use policies.

State law recognizes that General Plans are evolving documents, and that the blueprint for a City's growth must be continuously reevaluated and updated to reflect changing conditions and objectives. The State Office of Planning and Research issues General Plan Guidelines, the State's only official document interpreting General Plan law. The General Plan Guidelines state that:

*The general plan is a dynamic document because it is based on community values and an understanding of existing and projected conditions and needs, all of which continually change... The entire plan, including the basic policies should be thoroughly reviewed at least every five years and revised as necessary to reflect new conditions, local attitudes, and political realities.*

The time frames for planning vary considerably among issues and elements in the General Plan. The Guidelines note that sewer, water and road systems are generally designed with a 30 to 50-year lifespan, while capital improvement planning typically is based on a five-year time frame. The short span of capital improvement programs reflects, in part, the mutability of land use policies as they respond to rapidly changing economic trends.

The Tri-Valley Wastewater Authority sewer system is intended to provide the capacity to accommodate the land uses designated by the General Plans of member agencies. The Tri-Valley area has experienced continuous change over the last decade, from both the land use policy and development perspectives. New jurisdictions have been incorporated and major land use changes have occurred through adoption and revision of general plan policies.

Based on current planning activities in the Tri-Valley, it is evident that land use policies in the area will continue to evolve. Planning efforts that will result in major General Plan amendments are underway in north Livermore, east and west Dublin, west Pleasanton and the Dougherty/Tassajara Valleys. These policy changes are occurring independent of sewer capacity considerations. Sewer capacity constraints could, however, limit the ability of local jurisdictions to modify land use policies to reflect changing economic conditions and community goals.





### III. RELATIONSHIP BETWEEN INFRASTRUCTURE AND GROWTH

---

The economic effect of providing public infrastructure is a subject with important implications for public policy regarding land use, the pricing of services, and the fostering of economic development. There is a general consensus that the lack of infrastructure can limit growth and development. There is, however, a great deal of uncertainty about how public infrastructure affects the economics of growth, and the extent to which the provision of infrastructure can actually induce economic expansion.

The literature on the growth effects of infrastructure has been produced principally by two academic and professional disciplines: urban planning and regional economics. Planning literature generally holds that infrastructure may determine the location of development, but not stimulate the economic demand for it. The regional economic literature takes a more rigorous statistical approach to the question and is more ambiguous in its conclusions. Each of these approaches to the issue is discussed in more detail below.

In an article that is representative of the planning perspective, Bamberger, Blazar and Peterson (1985), state that infrastructure is a primary location decision factor that affects the selection of specific communities and development sites within a region. They maintain that inter-regional location decisions are based more on factors such as labor force, climate and market proximity. This conclusion is consistent with earlier work done for the Council on Environmental Quality by Urban Systems Research & Engineering, Inc. (1976), which holds that "...infrastructure merely concentrates growth which might otherwise have been located elsewhere in the region." Bamberger et al conclude that there is a large degree of uncertainty about the economic returns to infrastructure.

Regional economists are concerned with the economic effects of infrastructure as it relates to economic development. Public investment in infrastructure has long been an accepted means of attempting to foster economic development; thus, there has been at least the presumption that public infrastructure can stimulate private production. Yet, the literature reveals that little is known about the actual economic effects of infrastructure investment. Attempts to verify and measure these effects through rigorous statistical analysis have only been undertaken fairly recently.

Some of the earliest contemporary work done on this subject was performed by Niles Hansen, of the University of Texas. In a 1965 paper, he suggests that economic growth is largely a result of private investment, stemming from favorable economic geography; that is, locational and natural resource advantages of particular places. His thesis is that the investment of private capital stimulates the demand for public infrastructure which in turn leads to more growth.

Hansen identifies three types of regions: congested, intermediate and lagging. Each type corresponds to a stage of development and is distinct with respect to the economic effects that are induced by infrastructure investment. Hansen concludes that public infrastructure investment will stimulate growth in intermediate and congested regions, but not in lagging



regions. This finding follows from his conclusion that growth is not induced primarily by infrastructure, but rather stems from the favorable attributes of the region. Intermediate and congested regions are already experiencing growth due to other economic advantages, and additional infrastructure capacity allows more businesses to capitalize on those assets.

Hansen's theory was tested statistically by Looney and Frederiksen (1979) using time series data by region for Mexico. The statistical analysis tentatively confirmed Hansen's theories for Mexico; each measure of infrastructure was statistically significant in explaining differences in gross domestic product in intermediate regions, but not in lagging regions.

These findings have been reconfirmed by a number of subsequent statistical analyses of empirical data. In 1986, the Federal Reserve Bank of Cleveland analyzed data for 38 metropolitan areas from 1958 to 1981, and concluded that public infrastructure investment significantly affects manufacturing output, but much less than do private capital and labor inputs. The author notes that public capital stock affects economic activity in a variety of ways -- by influencing the locational decisions of businesses and households, by increasing the agglomeration economies of regions, and by entering into firms' production functions as an unpaid factor.

Eberts and Fogarty (1987) conducted a statistical analysis of data for 40 cities in the United States. They found that in the period after World War II, public capital outlays were statistically correlated with private investment in 33 of the 40 cities. The results, however, show that the influence worked in both directions; in half of the cities, public outlay preceded private investment; in a smaller number of cities, private investment preceded public outlays.

An article by Dahlenberg and Eberts (1988) cites studies that show that public investment stimulates private investment, both in local economies and at the national level. Their research indicates that certain types of infrastructure, including transportation and communication, have a larger effect on economic growth than do other types of infrastructure.

In sum, the following conclusions may be drawn from the literature:

- The lack of adequate infrastructure is a constraint to economic development.
- The provision of infrastructure can have a major effect on the location and timing of development within a region.
- Public investment in infrastructure is an accepted means of attempting to foster economic development, although, empirical research yields ambiguous conclusions as to the effectiveness of such investment.
- It is generally held that infrastructure, by itself, is not sufficient to induce economic growth; other favorable economic factors must be present, and are generally more important.
- Certain types of infrastructure, notably transportation and communications, may have a more stimulating effect on growth than other types.





## REFERENCES

The following articles and books were reviewed in the course of the survey of literature on the effects of infrastructure on growth :

- Bamberger, Rita, William A. Blazar, and George E. Peterson. "Infrastructure Support for Economic Development," Planning Advisory Service Reports, September 1985, pp. 1-6, 20, 31-38.
- Dahlenberg, Douglas, and Randall W. Eberts. "Public Infrastructure and Economic Development", Economic Commentary, Federal Reserve Bank of Cleveland, January 15, 1988.
- Eberts, Randall W., and Michael S. Fogarty. "Estimating the Relationship Between Local Public and Private Investment," Working Paper 8703, Federal Reserve Bank of Cleveland, May 1987.
- Federal Reserve Bank of Cleveland. "Estimating the Contribution of Urban Public Infrastructure to Regional Growth," Working Paper 8610, December 1986.
- Hansen, Niles M. "Unbalanced Growth and Regional Development, " Western Economic Journal, vol. 4, (Fall 1965), pp. 3-14.
- Helms, L. Jay. "The Effect of State and Local Taxes on Economic Growth: A Time Series-Cross Section Approach," Review of Economics and Statistics, vol.67, no. 4 (November 1985), pp. 574-582.
- Leven, Charles, John Leger, and Perry Shapiro. An Analytical Framework for Regional Development Policy. Cambridge, MA: The MIT Press, 1970.
- Looney, Robert, and Peter Frederiksen. "The Regional Impact of Infrastructure Investment in Mexico," Regional Studies, vol. 15, no. 4 (1981), pp. 285-96.
- Mera, Keoichi. Income Distribution and Regional Development. Tokyo, Japan: University of Tokyo Press, 1975.
- Meade, J. E. "External Economies and Diseconomies in a Competitive Situation," Economic Journal, vol. 62 (March 1952), pp. 54-67.
- Reddaway, W. B. "Infrastructure Investments and Their Contribution to Employment and Economic Growth - Report on a Joint Meeting of Management and Trade Union Experts under the OECD Labour/Management Programme," Organization for Economic Co-operation and Development General Distribution, March 1986.
- Segal, David. "Are There Returns to Scale in City Size?" The Review of Economics and Statistics, vol. 58, no.3 (August 1976), pp. 339-50.





Sveikauskas, Leo A. "The Productivity of Cities," Quarterly Journal of Economics, vol. 89, no. 3 (August 1975), pp. 393-413.

Tolley, George S., and B. Smith. "Scale Economies, Externalities, and City Size," in Tolley, Graves, and Gardner, eds., Urban Growth Policy in a Market Economy. New York: Academic Press, 1979, pp. 37-49.

Urban Systems Research & Engineering, Inc. "The Growth Shapers - The Land Use Impacts of Infrastructure Investments," May 1976.



## IV. PROJECTED UTILIZATION OF EXISTING SEWER CAPACITY

---

This section of the report presents an analysis of future utilization of wastewater facilities in the Tri-Valley Wastewater Authority (TWA) service area. The projected use of wastewater facilities is analyzed independently for each of the three service areas: Pleasanton, Livermore and the Dublin San Ramon Services District (DSRSD).

Two analyses have been performed for each service area. A "projected use" analysis estimates the year in which capacity will be fully utilized, based on population and employment growth projections. An "allocated use" analysis combines each area's sewer allocation policies with the growth projections to estimate the year during which sewer allocations will be exhausted. In other words, the "projected use" analysis focuses on the actual sewer hookups and use of the system, and the "allocated use" examines when the approval for use is granted.

The conclusions of the analyses are outlined below in the first section. The second section describes the sewer allocation policies in each service area. The third section describes the methodology and general assumptions of the analyses, as well as the specific assumptions used in each service area.

### SUMMARY OF CONCLUSIONS

#### PROJECTED USE

Table IV-1 shows, for each service area, the export capacity, existing flow, remaining capacity and year(s) the capacity and allocations are projected to be fully utilized. The figures are expressed in millions of gallons per day (mgd) of average dry weather flow (adwf). Based on the most recent estimates available, the City of Pleasanton had 2.611 mgd of remaining capacity as of August 1988, the City of Livermore had 3.229 mgd remaining capacity as of January 1989, and DSRSD had 0.816 mgd remaining capacity as of July 1989. While the existing flow and remaining capacity estimates originally provided for the three service areas are for different dates, the differences have been reconciled through adjustments to the projection figures.

Total sewage export capacity is estimated to be fully utilized in Pleasanton by 1997, in Livermore by 2000 and in DSRSD during 1997.

Table IV-2 summarizes the annual balance between future sewer export needs and remaining capacity in Pleasanton, Livermore and DSRSD. The annual increase in sewer use from 1989 through 2000 averages 0.29 mgd in Pleasanton, 0.27 mgd in Livermore and 0.10 mgd in DSRSD.





**Table IV-1  
Remaining Sewage Export Capacity and  
Projected Year Capacity Is Fully Utilized  
Livermore, Pleasanton and DSRSD (1)**

<b>Category</b>	<b>Pleasanton (MGD)</b>	<b>Livermore (MGD)</b>	<b>DSRSD (MGD)</b>	<b>TOTAL (MGD)</b>
<b>Total Capacity</b>	7.106	8.229	4.385	19.720
<b>Existing Flow (2)</b>	4.495	5.000	3.569	13.064
<b>Remaining Capacity (3)</b>	2.611	3.229	0.816	6.656
<b>Projected Year Capacity Is Fully Utilized</b>	1997	2000	1997	
<b>Projected Year Allocations Are Fully Utilized (4)</b>	1994 to 1995	1997 to 1998	1996	

(1) Measured in terms of millions of gallons per day (MGD) for average dry weather flow (ADWF).

(2) Existing flow as of the following dates: Pleasanton 8/88; Livermore 1/89; DSRSD 7/89.

(3) Includes reserve allocations set aside for projects that have yet to be developed or have vacant space.

(4) Allocations represent when development has been approved under each jurisdiction's growth management program.

Sources: City of Pleasanton, "Growth Management Report, 1989"; City of Livermore;  
DSRSD; Economic and Planning Systems, Inc.



**Table IV-2**  
**Summary of Projected Sewer Use and Remaining Capacity (1)**  
**Pleasanton, Livermore and DSRSD**  
**1989 to 2000**

Category	End Of Calendar Year:												
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Pleasanton													
Sewer Use (MGD)													
Annual Increase (2)		0.765	0.263	0.270	0.277	0.285	0.227	0.230	0.233	0.236	0.239	0.242	0.245
Cumulative		0.765	1.028	1.298	1.575	1.860	2.087	2.317	2.550	2.786	3.025	3.267	3.512
Remaining Capacity	2.611	1.846	1.583	1.313	1.036	0.751	0.524	0.294	0.061	(0.175)	(0.414)	(0.656)	(0.901)
Livermore													
Sewer Use (MGD)													
Annual Increase		0.415	0.313	0.243	0.254	0.264	0.228	0.234	0.242	0.248	0.257	0.265	0.274
Cumulative		0.415	0.728	0.971	1.225	1.489	1.717	1.951	2.193	2.441	2.698	2.963	3.237
Remaining Capacity	3.229	2.814	2.501	2.258	2.004	1.740	1.512	1.278	1.036	0.788	0.531	0.266	(0.008)
DSRSD													
Sewer Use (MGD)													
Annual Increase		0.051	0.080	0.080	0.080	0.080	0.073	0.125	0.125	0.122	0.119	0.119	0.119
Cumulative		0.051	0.131	0.211	0.291	0.371	0.444	0.569	0.694	0.816	0.935	1.054	1.173
Remaining Capacity	0.816	0.765	0.685	0.605	0.525	0.445	0.372	0.247	0.122	0.000	(0.119)	(0.238)	(0.357)

(1) Measured in terms of millions of gallons per day (MGD) and average dry weather flow (ADWF).

(2) Includes development in last six months of 1988: 1,200 jobs and 550 dwelling units.

Sources: City of Pleasanton; City of Livermore; DSRSD; Gruen Gruen + Associates; Economic and Planning Systems, Inc.



## ALLOCATED USE

Since sewer allocations precede actual development and sewer use, the jurisdictions in the service areas are likely to exhaust their sewer allocations and subsequent ability to approve new development before the actual sewer capacity runs out. Future sewer allocation practices are dependent on the level of demand and City policies on growth management.

Based on discussions with City of Livermore staff, EPS estimate that all available sewer allocations could be exhausted two to three years prior to development, or by 1997 or 1998. Based on Pleasanton's current growth management policies and the pace of development, it was estimated that all allocations could be exhausted two to three years prior to development, or by 1994 or 1995. In the DSRSD service area, sewer allocations are distributed on a first-come, first-serve basis. Therefore, DSRSD is estimated to exhaust its allocations by 1996, the year preceding the development that would utilize the last of remaining capacity.

## **SEWER ALLOCATION POLICIES**

In Livermore and Pleasanton, sewer allocations are controlled by each City's growth management program. DSRSD distributes sewer permits to projects once they have been granted final map approval by either the City of Dublin or San Ramon.

Future sewer allocation actions are dependent on a variety of factors, such as the number and scale of proposed projects, the projected pace of development and each City's growth policies. In order to estimate when each area's "allocated use" will be exhausted, EPS interviewed staff at each of the member agencies and evaluated each agency's current allocation policies.

## LIVERMORE

In Livermore, the growth management plan, referred to as the Housing Implementation Program (HIP), distributes sewer allocations to residential projects over 10 units. Proposed residential projects are evaluated by the City and the approved projects are awarded sewer allocations. The recently published 1990 HIP rankings distributed allocations through 1993.

Residential developments of less than 10 units receive sewer allocations once they receive tentative map approval. Similarly, commercial developments receive sewer allocations at the time the site plan is approved. The City maintains a policy of reserving an equal amount of residential and commercial sewer allocations. Based on a review of the HIP process and discussions with City Staff, it was assumed that sewer allocations in Livermore are likely to precede development by two to three years.

## PLEASANTON

In Pleasanton, the Growth Management Program is designed to maintain a balance between approved development and the City's ability to provide services. A major component of this balance is the City's ability to provide sewer services to future development. A Growth Management Report is published annually to identify the existing service conditions in the





City. Based on the information in this report, the City Council can award Growth Management allocations to approved projects. The Council is limited to awarding allocations for a maximum of 750 units each year (650 market rate units plus 100 low income units). In addition to the current year allocations, the Council is permitted to award future year allocations. In the most recent Growth Management allocations, projects were awarded allocations through 1993.

The current backlog of sewer allocation agreements in Pleasanton is an example of how "allocated use" precedes development. Currently, the City has reservation agreements for sewer permits with some of the larger business parks, such as Hacienda Business Park, for vacant buildings and approved but undeveloped land and residential projects that have yet to be completed. The current bank of reservations are expected to be utilized in the next few years. Overall, as a result of Pleasanton's growth management process, we estimate that sewer allocations are likely to precede development by two to three years.

### DSRSD

According to staff at DSRSD and the Cities of San Ramon and Dublin, sewer allocations are not granted until the appropriate jurisdiction approves the project's final map. Since the time lapse between final map approval and development is around one year, it was estimated that the sewer allocations will precede actual use by one year.

## DEVELOPMENT PROJECTIONS

In each service area, estimates of future sewer use are based on projections of residential development and employment growth and the average sewer use per single-family unit, multi-family unit and employee. This analysis assumes that sewer use is 220 gallons per day (gpd) for single-family units, 180 gpd for multi-family units and 70 gpd for employees. The mix between single-family and multi-family units is based on a specific assumption for each service area.

The residential development projections in Livermore and Pleasanton are based on the guidelines of each City's growth management plan. In the DSRSD service area, residential projections are based on identified projects, long-range estimates outlined in the Wastewater Collection System Master Plan, region-wide demand projections and discussions with DSRSD, City of Dublin and City of San Ramon staff.

The employment growth projections are based on the implied annual average growth rate of employment in the "Growth Attainable Without Constraints Scenario" published in the Projections of Employment and Household Growth in the Tri-Valley Subregion, by Gruen Gruen + Associates. For the cities of Dublin, Pleasanton and Livermore, the 1989 employment estimates are increased by the implied growth rate. In the portion of San Ramon serviced by DSRSD, identified projects and standard employment density factors were used as the basis for projecting employment growth.



**Table IV-3** summarizes the residential development projections for Livermore, Pleasanton, Dublin and the portion of San Ramon serviced by DSRSD. **Table IV-4** summarizes the results of the employment projections for the three cities and the DSRSD-serviced portion of San Ramon. The following sections discuss the assumptions used for each service area. Tables showing projected growth and sewer use for each jurisdiction are included in **Appendix A**.

## PLEASANTON

According to the 1989 Growth Management Plan, there is a backlog of 2,141 dwelling units that have Growth Management allocations in Pleasanton. In addition, 550 units have been added to the 1989 development backlog to account for the last four months of sewer use in 1988. (As shown on **Table IV-1**, the effective date of existing flow in Pleasanton is August 1988). Future development in Pleasanton is projected to be 650 units per year, the maximum number of market-rate units. The mix of unit types in Pleasanton is assumed to be 75 percent single-family and 25 percent multi-family.

While the above development assumptions are in line with historical allocations, 650 units per year may be conservative since allocations for only 500 units were made in 1989. The higher development estimate (650 units/year) is considered conservative since it results in reaching export capacity sooner. If the development projections are decreased to 550 units per year, Pleasanton is still projected to exhaust its export capacity during 1997.

Total employment in Pleasanton is estimated to be 30,900 as of the beginning of 1989. The annual growth rate assumptions for employment are 5.34 percent through 1994 and 3.10 percent from 1995 through 2000. An additional 1,200 employees have been added to the 1989 estimate to account for sewer use over the last four months of 1988.

Overall, with the backlog of approved development and projected development of an additional 650 units per year, approximately 7,900 dwelling units are projected for development through 1997. This growth accounts for increased sewer needs of 1.66 mgd. Through 1997, over 16,000 employees are projected to be added in Pleasanton. This amount of growth is expected to add around 1.12 mgd of sewer use to the existing system. **Table A-1** presents the growth projections and estimated sewer use in the City of Pleasanton from 1989 to 2000.

## LIVERMORE

Residential development projections for 1989 and 1990 are based on the City's residential development activity list. According to the City's activity list, there were 1,436 approved units with sewer allocations that could be developed in 1989. In 1990, there are a total of approximately 930 units with sewer allocations that can be developed, (439 units with prior approvals and 488 from the 1990 HIP list). From 1991 through 2000, it has been assumed that residential development will occur at a 2.5 percent growth rate, which was recently reduced by the Livermore City Council from the previously allowed rate of 3.5 percent per year. The mix of unit types in Livermore is assumed to be 85 percent single-family and 15 percent multi-family.





**Table IV-3  
Residential Development Projections (Dwelling Units)  
Livermore, Pleasanton and DSRSD  
1989 to 2000**

Jurisdiction	End Of Calendar Year:												
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>Livermore (1)</b>													
Annual DU's		1,436	930	570	590	600	620	630	650	660	680	700	720
Total DU's	20,551	21,987	22,917	23,487	24,077	24,677	25,297	25,927	26,577	27,237	27,917	28,617	29,337
<b>Pleasanton (2)</b>													
Annual DU's		2,691	650	650	650	650	650	650	650	650	650	650	650
Total DU's	17,628	20,319	20,969	21,619	22,269	22,919	23,569	24,219	24,869	25,519	26,169	26,819	27,469
<b>Dublin</b>													
Annual DU's		100	150	150	150	150	150	300	300	300	300	300	300
Total DU's	6,717	6,817	6,967	7,117	7,267	7,417	7,567	7,867	8,167	8,467	8,767	9,067	9,367
<b>Relevant Portion of San Ramon</b>													
Annual DU's		100	200	200	200	200	200	300	300	300	300	300	300
Total DU's	3,098	3,198	3,398	3,598	3,798	3,998	4,198	4,498	4,798	5,098	5,398	5,698	5,998
<b>TWA Service Area</b>													
Annual DU's		4,327	1,930	1,570	1,590	1,600	1,620	1,880	1,900	1,910	1,930	1,950	1,970
Total DU's	44,896	49,223	51,153	52,723	54,313	55,913	57,533	59,413	61,313	63,223	65,153	67,103	69,073

(1) Assumes a 2.5% percent annual growth rate after 1990.  
(2) The 1989 development estimate includes development projected for the last six months of 1988: 550 units.

Sources: California State Department of Finance; City of Pleasanton; City of Livermore; DSRSD; Economic and Planning Systems, Inc.



**Table IV-4**  
**Employment Growth Projections (1)**  
**Livermore, Pleasanton, Dublin and San Ramon**  
**1990 to 2000**

Jurisdiction	End Of Calendar Year:												
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>Livermore</b>													
Annual Employment		1,542	1,634	1,730	1,833	1,941	1,357	1,411	1,466	1,523	1,582	1,644	1,709
Total Employment	26,045	27,587	29,221	30,951	32,784	34,725	36,083	37,493	38,959	40,482	42,064	43,709	45,417
<b>Pleasanton (2)</b>													
Annual Employment		2,851	1,803	1,899	2,001	2,108	1,288	1,328	1,370	1,412	1,456	1,501	1,547
Total Employment	30,900	33,751	35,554	37,453	39,454	41,562	42,850	44,179	45,549	46,961	48,416	49,917	51,465
<b>Dublin</b>													
Annual Employment		193	196	199	202	206	99	99	100	101	102	102	103
Total Employment	12,300	12,493	12,689	12,889	13,091	13,297	13,395	13,495	13,595	13,696	13,797	13,900	14,003
<b>Relevant Portion of San Ramon (3)</b>													
Annual Employment		0	0	0	0	0	0	92	92	46	0	0	0
Total Employment	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,292	1,384	1,430	1,430	1,430	1,430
<b>TWA Service Area</b>													
Annual Employment		4,586	3,633	3,829	4,036	4,255	2,745	2,930	3,027	3,082	3,140	3,248	3,359
Total Employment	70,445	75,031	78,664	82,493	86,529	90,784	93,529	96,459	99,486	102,568	105,708	108,956	112,315

(1) Annual Average Growth Rate Assumptions From GG+A Growth Attainable Without Constraints Scenario:

Livermore: 1990-94: 5.92% 1995-99: 3.91% Pleasanton: 1990-94: 5.34% 1995-99: 3.10% Dublin: 1990-94: 1.57% 1995-99: 0.74%

(the Dublin figures assume that East Dublin's commercial uses do not capture significant employment until after 2000.)

(2) The 1989 employment estimate includes employment growth projected for the last six months of 1988: 1,200 jobs.

(3) Projections are based on specific project information.

Sources: Gruen Gruen + Associates, Projections of Employment and Household Growth in the Tri-Valley Subregion, 1985;  
Economic and Planning Systems, Inc.



Total employment in Livermore was estimated to be 26,045 as of the beginning of 1989. The annual growth rate assumptions for employment are 5.92 percent through 1994 and 3.91 percent from 1995 through 2000.

Overall, approximately 7,365 dwelling units are projected for development through 1998. This accounts for increased sewer needs of 1.58 mgd. Through 1998, over 16,000 employees are projected to be added in Livermore. This amount of growth is expected to add around 1.12 mgd of sewer use to the existing system. Table A-2 presents the growth projections and estimated sewer use in the City of Livermore from 1989 to 2000.

### DUBLIN SAN RAMON SERVICES DISTRICT

According to DSRSD staff, there is remaining sewer capacity for 3,600 dwelling units in this service area. Since DSRSD does not have a growth management plan and Dublin and San Ramon do not have specific growth management policies for their areas within the DSRSD service area, the growth projections used in this analysis are based on a compilation of proposed projects, and ABAG household growth projections for the Tri-Valley.

Household projections for the cities in the Tri-Valley, published by ABAG, show an annual housing demand for around 2,375 units over the five-year period from 1990 through 1994. Since the major planned projects in the DSRSD area, including West Dublin, East Dublin and Tassajara and Dougherty Valleys, are not expected to begin until 1994 or later, it was assumed that the DSRSD capture of annual Tri-Valley demand over the next five years would be limited to 15 percent, or 350 units per year.

Based on discussions with the DSRSD staff, the following projects are in the development process and are assumed to be built between 1989 and 1994 (number of units in parenthesis): Alamo Creek (200), Heritage Commons (230), Ponderosa Homes (375), Hansen Ranch (200), Davidon (136), Donlan Canyon (317), Dublin Meadows (206) and Alcosta Mall Area (152). These projects account for a total of 1,816 units. In addition to the 1,816 units identified above, infill development and the initial stages of projects in West Dublin, East Dublin or the Tassajara and Dougherty Valleys are assumed to be developed over the next five years. Overall, 1,950 units are projected to be developed through 1994 in the DSRSD service area, including 200 units developed in 1989.

Residential development in the DSRSD area after 1995 is expected to come from five major projects currently in the preliminary planning stages. Based on discussions with San Ramon planning staff, City of Dublin planning staff and a review of the DSRSD Master Plan, we have identified 38,295 units spread among the following five projects: West Dublin (4,400), East Dublin (15,000), San Ramon Westside (1,275), Windemere (2,100), Shapell (2,490) and East of Tassajara Road (13,030).

Between 1995 and 2000, ABAG household projections imply annual demand of around 2,400 units in the Tri-Valley. As central areas of San Ramon, Dublin, Pleasanton and Livermore buildout, the areas of West Dublin, East Dublin, West San Ramon and the Tassajara and Dougherty Valleys are likely to increase their capture of residential demand. Hence, it was assumed that the DSRSD area increases its capture rate of projected demand to 25 percent, or





to an annual demand of 600 units per year. In line with discussions with DSRSD staff, it was assumed that the mix of unit types in this area is 75 percent single-family and 25 percent multi-family.

Total employment in Dublin is estimated to be 12,300 as of the beginning of 1989. The annual growth rate assumptions for employment are 1.57 percent through 1994 and 0.74 percent from 1995 through 2000. The only commercial development project identified in the relevant portion of San Ramon is the 120,000 square foot retail center proposed by Prometheus Development. It was assumed that this development would come on-line in 1995 and will accommodate 230 employees at buildout. The commercial uses planned for east Dublin are assumed not to capture significant employment until after 2000.

Overall, approximately 3,750 dwelling units are projected for development through 1997. This accounts for increased sewer needs of 0.70 mgd. Over the same period, 1,625 employees are projected to be added in DSRSD area. This amount of growth is expected to add around 0.11 mgd of sewer use to the existing system. **Table A-3** presents the growth projections and estimated sewer use in the Dublin San Ramon Services District from 1989 to 2000.



## V. FORECAST OF LAND USE POTENTIAL AND SEWER CAPACITY REQUIREMENTS UNDER ALTERNATIVE GENERAL PLANS SCENARIOS

---

This section summarizes the population, housing and employment potential of existing and prospective General Plans, based on the updated land use data compiled for this study. A forecast is then made of the development that could occur under alternative General Plan policies in light of the key constraints that will affect the realization of growth potentials. These constraints are labor force availability and transportation capacity.

The Prospective General Plans Scenario adds to existing General Plans a number of major General Plan amendments that currently are in various stages of the planning process, including North Livermore, Pleasanton Ridge, West Dublin, East Dublin, and the Tassajara and Dougherty Valleys. The Prospective General Plans Scenario is comparable to the higher intensity scenario analyzed in the initial EIR. The TWA service area, the larger Tri-Valley, and the areas included in the Prospective General Plans Scenario are shown on **Figure I-1** (page 2).

Based on the labor force and transportation constraints analysis, a third land use policy scenario is defined. The constrained General Plans Scenario represents Existing General Plan capacities, less the employment potential that may not be realized due to labor force and transportation constraints.

Finally, the sewerage capacity needed to serve future growth under existing, prospective and constrained General Plan land use scenarios is estimated.

### LAND USE POTENTIAL UNDER EXISTING AND PROSPECTIVE GENERAL PLANS

#### LAND USE UPDATE METHODOLOGY

The land use data underlying this analysis represents a comprehensively updated tabulation of existing development, planned projects and the holding capacity of vacant land designated for urban development. The data have been compiled into a computerized database at the traffic zone level, and have been aggregated to jurisdiction and subarea of the TWA service area for this analysis.

For the purpose of this analysis, EPS defined eleven analysis areas for the Tri-Valley. The analysis areas are geographically defined subareas within which development potential could more easily be tracked. Each of the Tri-Valley's five jurisdictions have been defined as an independent analysis area. The six other areas represent land currently under the jurisdiction of Contra Costa or Alameda County. The eleven areas are: Alamo-Blackhawk, Danville, San Ramon, Tassajara and Dougherty Valleys, Dublin, East Dublin, West Dublin, Pleasanton, Pleasanton Ridge, Livermore, and North Livermore.





The land use update involved the following steps:

1. Working closely with TJKM Transportation Consultants, EPS compiled an initial data set for eleven analysis areas for the Tri-Valley.
2. Drawing from City records, EPS identified the approved General Plan amendments that were not accounted for in the initial data set. These changes were coded into the database.
3. In addition to the recently approved amendments, EPS identified those development projects that either have approved development or are in the planning process. Drawing from city records, the potential number of dwelling units and/or commercial building space was estimated. The corresponding employment and population potentials for each project was calculated using standard employment density and persons per household assumptions. The development potential of these projects was then entered into the EPS database by traffic zone and summarized by analysis area.
4. Current plans for the five major General Plan amendments included in the prospective General Plans scenario were obtained from the appropriate city and consulting team. The employment, housing and population potentials for each project was calculated using standard employment density and persons per household assumptions. The development potential of these projects was then entered into the EPS database by traffic zone and summarized by analysis area.
5. EPS produced an estimate of the existing (1989) conditions in the Tri-Valley. For each analysis area, estimates of current population, housing and employment were produced. Department of Finance data was used for the population and housing estimates. The employment estimates were generated by using commercial building space and ABAG data.
6. The next step of the updating process was to check the land use potential for each analysis area. The review process entailed combining estimates of existing conditions (step 5) with the remaining potential of approved and planned projects (step 3) and comparing them to the buildout potential for each analysis area. This process allowed EPS to identify and correct inconsistencies in the General Plan data that may be caused by recent development proposals.
7. An updated land use data set for each analysis area was then produced. The land use data, summarized by traffic zone and analysis area, was distributed to the planning departments of the five cities in the Tri-Valley for their review and comment.
8. Following the comments from all of the planning departments, final edits were made to the database.



The population and employment assumptions used to estimate land use potential are as follows:

Use Type	Vacancy Rate	Persons per Unit	Square Feet per Employee
<u>RESIDENTIAL</u>			
Single Family	4.0%	3.00	
Multi-Family	4.0%	2.00	
<u>NON-RESIDENTIAL</u>			
Retail	5.0%		510
Service Commercial	5.0%		490
Office	5.0%		260
Light Industrial	5.0%		590
Hotel/Motel	5.0%		1,060
Research & Development	5.0%		360
Warehouse	5.0%		1,300
Restaurant	5.0%		175

The results of this process, an update of the General Plan land use potential for the Tri-Valley, are discussed in the following section. The data has been summarized by for the total Tri-Valley, TWA Service Area and analysis area.

#### LAND USE POTENTIAL

Table V-1 summarizes land use potential under the Existing and Prospective General Plans Scenarios for both the TWA service area and the Tri-Valley as a whole. These data are detailed by analysis area in Tables V-2 and V-3.

Potential in the TWA service area under Existing General Plans is estimated to be 228,000 residents and 259,000 jobs. These estimates represent about 71 and 82 percent, respectively, of the totals for the Tri-Valley.



**Table V-1**  
**Summary of General Plan Land Use Potentials**  
**Existing General Plans and Prospective General Plans Scenarios**  
**Total Tri-Valley and TWA Service Area**

Scenario and Area	SF UNITS	MF UNITS	TOTAL UNITS	POPULATION	EMPLOYMENT
<b>Existing General Plans</b>					
Total Tri-Valley	89,663	33,043	122,706	321,667	314,864
TWA Service Area (1)	62,043	25,802	87,845	228,219	258,573
TWA Service Area as % of Tri-Valley	69%	78%	72%	71%	82%
<b>Prospective General Plans Scenario (2)</b>					
Total Tri-Valley	114,550	58,594	173,144	442,397	311,784
TWA Service Area (1)	86,930	51,353	138,283	348,949	255,493
TWA Service Area as % of Tri-Valley	76%	88%	80%	79%	82%

(1) Excludes Danville, Alamo-Blackhawk and Northern San Ramon.

(2) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.





**Table V-2**  
**Land Use Potentials for the Existing General Plans Scenario**  
**By Analysis Area**  
**TWA Service Area (1)**

Analysis Area	SF UNITS	MF UNITS	TOTAL UNITS	POPULATION (2)	EMPLOYMENT (3)
Alamo-Blackhawk	0	0	0	0	0
Danville	0	0	0	0	0
San Ramon	7,673	2,568	10,241	27,029	1,483
Tassajara & Dougherty Valleys	4,584	0	4,584	13,202	233
Dublin	4,477	4,133	8,610	20,829	11,346
East Dublin	0	2,500	2,500	4,800	54,287
West Dublin	0	0	0	0	0
Pleasanton	19,042	10,168	29,210	74,364	80,675
Pleasanton Ridge	259	0	259	745	0
Livermore (4)	23,760	6,427	30,187	80,763	92,769
North Livermore	2,248	6	2,254	6,487	17,780
<b>Total</b>	<b>62,043</b>	<b>25,802</b>	<b>87,845</b>	<b>228,219</b>	<b>258,573</b>

(1) Excludes Danville, Alamo-Blackhawk and Northern San Ramon.

(2) Assumes a 4% vacancy rate, 3 persons per single family unit and 2 persons per multi-family unit.

(3) Assumes a 5% vacancy rate and the following employment densities (employees per square feet of building space): Retail-510; Office-260; Service-490; Industrial-590; Motel-1,060; R&D-360; Restaurant-175; Warehouse-1,300.

(4) Includes Springtown.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.



**Table V-3**  
**Land Use Potentials for the Prospective General Plans Scenario (1)**  
**By Analysis Area**  
**TWA Service Area (2)**

Analysis Area	SF UNITS	MF UNITS	TOTAL UNITS	POPULATION (3)	EMPLOYMENT (4)
Alamo-Blackhawk	0	0	0	0	0
Danville	0	0	0	0	0
San Ramon	7,673	2,568	10,241	27,029	1,483
Tassajara & Dougherty Valleys	8,585	11,985	20,570	47,736	4,000
Dublin	4,477	4,133	8,610	20,829	11,346
East Dublin	4,500	10,500	15,000	33,120	46,192
West Dublin	2,843	1,600	4,443	11,259	1,228
Pleasanton	19,042	10,168	29,210	74,364	80,675
Pleasanton Ridge	2,020	0	2,020	5,817	0
Livermore (5)	23,760	6,427	30,187	80,763	92,769
North Livermore	14,030	3,972	18,002	48,032	17,800
<b>Total</b>	<b>86,930</b>	<b>51,353</b>	<b>138,283</b>	<b>348,949</b>	<b>255,493</b>

(1) Includes existing General Plans plus amendments for major planning areas where the planning process has been initiated.

(2) Excludes Danville, Alamo-Blackhawk and Northern San Ramon.

(3) Assumes a 4% vacancy rate, 3 persons per single family unit and 2 persons per multi-family unit.

(4) Assumes a 5% vacancy rate and the following employment densities (employees per square feet of building space): Retail-510; Office-260; Service-490; Industrial-590; Motel-1,060; R&D-360; Restaurant-175; Warehouse-1,300.

(5) Includes Springtown.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.





Potentials for the TWA service area under the Prospective General Plans Scenario are 349,000 residents and 255,000 jobs. These figures represent 79 and 82 percent of Tri-Valley totals, respectively. Employment potential actually is lower under the prospective plans, because the anticipated plan for East Dublin would allow less employment than theoretically is possible under the existing General Plan. Most of the other General Plan amendments are primarily residential.

The net addition of population, dwelling units and jobs in the TWA service area between 1989 and buildout, and the estimated number of years to buildout are shown in **Table V-4**. Population would increase by an estimated 86,000 residents under the existing General Plans, and 207,000 under the Prospective General Plans. Employment would increase by between 185,000 and 188,000 under the two alternatives.

In order to provide an indication of the time frame implied by the General Plan buildout figures, an estimate of the number of years to buildout was generated. Residential growth rates have been derived from City policies and ABAG projections. Employment growth rates were estimated based on the projections included in "Projections of Employment and Household Growth in the Tri-Valley Subregion:, 1985, by Gruen Gruen + Associates and region-wide projections. The rates used range between 1.5 and 2.5 percent per year for population, and between 2 and 3 percent for employment.

Based on these rates, residential buildout would take between 20 and 30 years under Existing General Plan capacities, and 40 to 60 years under Prospective General Plans. Buildout of employment potential would take between 45 and 65 years.

## **PROJECTED DEVELOPMENT UNDER ALTERNATIVE GENERAL PLANS**

The actual development that occurs under any given set of land use policies depends upon a variety of economic, social and political factors, including the demand for houses and building space, access to labor and markets, the cost of land relative to other available locations, and the ability to obtain entitlements to develop land. From a policy standpoint, a key factor is the degree to which the land use patterns implicit in General Plan policies can provide the basis of a functional urban system.

To sustain population and employment growth in a viable urban system, it is necessary that growth be accompanied by the infrastructure and public facilities needed to support it, and that there be a functional balance among land uses. Jobs/housing balance is perhaps the most important and widely recognized issue related to balanced land use. Economic growth cannot occur if there are not enough workers to fill potential jobs.

To the extent that workers must be imported from outside major employment centers, the imbalance between employment and housing potential can strain transportation infrastructure. The Bay Area, and many other growing regions, are already experiencing this strain. At some point, when both housing and transportation resources are used to capacity, the inability to provide sufficient labor resources will constrain further employment growth.



**Table V-4**  
**Population, Dwelling Unit and Employment Estimate**  
**Current and General Plan Buildout**  
**TWA Service Area**

Category	Population	Dwelling Units	Employment
<b>Total</b>			
Current (1989)	142,250	44,900	70,450
Existing General Plans Buildout	228,200	87,800	258,600
Prospective General Plans Buildout (2)	348,900	138,300	255,500
<b>Increase: 1989 to Buildout</b>			
Existing General Plans Buildout	85,950	42,900	188,150
Prospective General Plans Buildout (2)	206,650	93,400	185,050
<b>Years to Buildout (1)</b>			
Existing General Plans Buildout	20 to 30	20 to 30	45 to 65
Prospective General Plans Buildout (2)	40 to 60	40 to 60	45 to 65

(1) Assumes annual average growth rate between 1.5 and 2.5 percent for population and 2 and 3 percent for employment.

(2) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.





## CONSTRAINTS ANALYSIS

To estimate the amount of development that might actually occur under the General Plans Scenarios, EPS analyzed the amount of labor that could be provided to study area jobs from local housing resources, and how much could be imported, given planned transportation capacity at the "gateways" leading into the Tri-Valley. The gateways include all the freeway and arterial routes into the Tri-Valley from all directions.

The gateway analysis approach is somewhat optimistic in that it assumes that all transportation capacity from all gateways can be used to full capacity to bring workers to Tri-Valley jobs. In actuality, a disproportionate share of future labor force may be expected to commute from the Central Valley communities east of the Tri-Valley where more affordable housing is being built. On the other hand, it also does not reflect any major changes in transportation technology or commuter behavior.

**Table V-5** estimates the number of workers that could commute to Tri-Valley jobs from locations outside the Tri-Valley. Gateway capacities were estimated assuming all anticipated improvements to the freeway and road system. It was assumed that an additional 9,000 workers would arrive via rail transit, after BART is extended to the Tri-Valley area. It was further assumed that automobile occupancy would average 1.25 per vehicle.

Road capacity was assumed to be design capacity, which is the threshold between level of service (LOS) E and F. At LOS F traffic is characterized by intolerable delays and stop and go conditions. To the extent that these conditions prevail, commuters and employers are more likely to choose alternative locations.

Under current conditions, 49,000 workers pass through the four Tri-Valley gateways. Approximately, 79 percent of these workers (38,500) are commuting to jobs in the Tri-Valley. As shown in **Table V-5**, when fully improved, the transportation network will have capacity for 114,000 commuters at the Tri-Valley gateways, including rail transit riders. Assuming pass-through trips remain at the same percentage of total trips as they are now (per MTC), there would be capacity for a total of about 92,000 in-commuters to the Tri-Valley.

In order to estimate the constrained land use potential in the TWA service area, it was assumed that the service area would receive a proportion of Tri-Valley commuters equivalent to its proportion of total Tri-Valley employment potential. In both the General Plan and Prospective General Plans Scenarios, this proportion is estimated to be about 82 percent. Therefore, commuters potentially available to fill jobs in the TWA service area total about 76,000.

## CONSTRAINED DEVELOPMENT POTENTIAL

**Table V-6** estimates the constrained development potential under Existing and Prospective General Plans, given the gateway capacity analysis described above. The constraints only affect the employment potential, not residential potential, because jobs are dependent upon labor access. There is some level at which a lack of employment would constrain housing development. However, in the Bay Area economy this is not likely to be the case; employment potential exceeds housing potential both within the Tri-Valley and in the region as a whole.





**Table V-5**  
**Tri-Valley Gateway Traffic Analysis**  
**Tri-Valley's Share of Gateway Capacity**  
**Assuming Pass-Through Trips Remain at the 1989 Percentage (1)**

Gateway	Future Capacity Assuming All Planned Improvements		Pass-Through Factors	Tri-Valley's Share of Gateway Capacity (2)	
	Vehicles (3 Hr. Period)	Workers (3) (3 Hr. Period)	Percent of Trips With Non Tri-Valley Destination	Vehicles (4) (3 Hr. Period)	Workers (3 Hr. Period)
<b>From West</b>					
I-580	16,500	20,625	15%	14,000	17,500
Canyon Way	2,000	2,500	15%	1,700	2,100
Crow Canyon	2,000	2,500	15%	1,700	2,100
<b>From North</b>					
I-680	16,500	20,625	15%	14,000	17,500
Vasco	12,000	15,000	15%	10,200	12,800
<b>From East</b>					
I-580	16,500	20,625	55%	7,400	9,300
<b>From South</b>					
I-680	16,500	20,625	5%	15,700	19,600
Niles	2,000	2,500	5%	1,900	2,400
Rail Transit	0	9,000	0%	0	9,000
<b>TOTAL (4)</b>	<b>84,000</b>	<b>114,000</b>	<b>21%</b>	<b>66,600</b>	<b>92,300</b>

(1) Under existing conditions approximately 39,000 vehicles commute through the gateways.

This is equivalent to approximately 48,750 workers and 46 % of the future capacity.

(2) The Tri-Valley's share of capacity is equal to the future capacity minus the pass-through trips.

(3) Workers per vehicle is assumed to equal 1.25

(4) Figures may not add precisely due to rounding.

Sources: TJKM; Economic and Planning Systems, Inc.



**Table V-6****Projections of Tri-Valley Employment and Population Potential, Given Commutation Constraints  
Buildout of Existing General Plans and Prospective General Plans Scenario****TWA Service Area (1)**

<b>Category</b>	<b>Existing General Plans</b>	<b>Prospective General Plan Scenario (2)</b>
<b>Households in the TWA Service Area</b>	87,800	138,300
<b>Population in the TWA Service Area</b>	228,200	348,900
<b>Labor Force in the TWA Service Area (3)</b>	140,500	221,300
<b>Residents Employed in the TWA Service Area (4)</b>	84,300	132,800
<b>Employees that Commute Into the TWA Service Area (5)</b>	75,700	75,700
<b>Potential Employment Given Commutation Constraints (Sum of Two Previous Lines)</b>	160,000	208,500
<b>General Plan Employment Potential in TWA Service Area</b>	258,600	255,500
<b>Employment Potential Not Realized Due to Commutation Constraints</b>	98,600	47,000

(1) Excludes Danville, Alamo-Blackhawk and Northern San Ramon.

(2) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

(3) Workers Per Household: 1.60

(4) Percentage of Tri-Valley Residents who work in Tri-Valley as of Buildout: 60%

(5) Based on analysis of existing use and capacity of the gateways into the Tri-Valley (Table V-5). We have assumed that the TWA Service Area's share of commuters is equal to the Service Area's share of Tri-Valley employment in each scenario. Existing General Plans: 82%; Prospective General Plans: 82%

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.





## **Existing General Plans Scenario**

Under the Existing General Plans Scenario, about 88,000 households would reside in the TWA service area at buildout, providing a total labor force of about 141,000 workers. Some of these workers, however, will be employed outside the Tri-Valley. As more local employment opportunities are created and increasing traffic congestion influences many new households to live closer to their place of employment, more Tri-Valley residents can be expected to work in the Tri-Valley. Therefore, it was assumed that the percentage of the local labor force that works in the area will increase from the 1980 Census estimate of 48 percent to 60 percent by buildout. This assumptions also is consistent with projections published by the Metropolitan Transportation Commission (MTC).

Total Tri-Valley residents working in the service area, then, are estimated to be 84,300. As described on **Table V-5**, the Tri-Valley could capture around 92,000 workers commuting into the area through the gateways. It has been assumed that the TWA service area would capture a proportional share of these commuters based on the TWA service area's share of total Tri-Valley employment potential (82%, see **Table V-1**). As a result, there is a potential for an additional 75,700 in-commuters into the TWA service area and total employment potential of 160,000 jobs.

Land designated in existing General Plans could accommodate an estimated 258,600 jobs. Thus, about 98,500 of the jobs that would be allowed in the Existing General Plans are not likely to materialize, assuming current residential land use policies, due to labor force and commutation constraints.

## **Prospective General Plans Scenario**

As shown in **Table V-6**, Prospective General Plan land use policies would boost service area households to 138,300. Total resident work force would be 221,300, with about 133,000 of those available for jobs in the Tri-Valley. Given in-commute potential for an additional 75,700 workers, total employment potential increases to 208,500 under this scenario.

While employment potential, per land use policies, is roughly the same under the two scenarios, constrained employment drops by over 50,000 jobs under the Prospective General Plans. The added increment of housing essentially "buys" a large boost in economic development potential. The land use results of the two scenarios are summarized in **Table V-7**.

## **A THIRD SCENARIO: CONSTRAINED GENERAL PLANS**

The Superior Court ordered that a lower impact scenario be analyzed. The analysis above suggests an additional scenario that may be appropriate to the requirements of the court: the Constrained General Plans Scenario. This scenario represents the Existing General Plans, less the employment potential constrained by transportation capacity and labor force availability. Land use capacities would be 87,800 households, 228,000 residents, and 160,000 jobs. These capacities correspond to the Existing General Plans, with commutation constraints, shown in **Table V-7**.



**Table V-7****Projections of Tri-Valley Employment and Population Potential****Summary of Results For Existing General Plans and Prospective General Plans****TWA Service Area (1)**

<b>Scenario</b>	<b>Total Population</b>	<b>Total Employment</b>	<b>Constrained Employment (2)</b>
<b>1989 Existing Conditions</b>	142,250	70,450	NA
<b><u>No Constraints</u></b>			
Existing General Plans	228,200	258,600	NA
Prospective General Plans (3)	348,900	255,500	NA
<b><u>Commutation Constraints</u></b>			
Existing General Plans (4)	228,200	160,000	98,600
Prospective General Plans (3)	348,900	208,500	47,000

NA= Not Applicable.

(1) Excludes Danville, Alamo-Blackhawk and Northern San Ramon.

(2) Employment potential not realized due to traffic constraints. See Table V-6 for detail.

(3) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

(4) This represents the lower intensity scenario.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.



Given the reduction of job potential commensurate with the capacity of residential land and the transportation network, the Constrained General Plans Scenario represents a rationally defined lower level of development intensity in the TWA service area. This scenario does, however, represent a significant retrenchment from Existing General Plan employment capacities and would result in a number of land use impacts with potential financial, fiscal, and equity consequences. These impacts are discussed in **Section VI** of this report.

## **SEWAGE EXPORT REQUIREMENTS OF ALTERNATIVE GENERAL PLANS SCENARIOS**

The additional sewage export capacity needed to support each of the alternative General Plans Scenarios is presented in **Table V-8**. Export capacity needs are estimated to be 36.36 mgd for Existing General Plans, 45.80 mgd for Prospective General Plans, and 29.46 mgd for Constrained General Plans. Existing export capacity is 19.72 mgd. Therefore, sewerage expansion need would be 16.64 mgd under Existing General Plans, 26.08 mgd under Prospective General Plans, and 9.74 under Constrained General Plans.

**Table V-9** presents the export requirements of each of the TWA member agencies under the Existing and Prospective General Plans Scenarios. No allocation of expansion requirements to individual jurisdictions has been made under the Constrained General Plans Scenario. The political, economic and financial factors that will determine where employment growth occurs under this scenario are complex. Any attempt to estimate them in this report would be highly speculative.





**Table V-8**  
**Additional Sewage Export Requirements**  
**Given Projections of Employment and Population Potential**  
**TWA Service Area**

Scenario	Total Export Capacity Needed to Accomodate Growth (MGD)	Existing Export Capacity (MGD)	Export Expansion Required to Accomodate Growth (MGD)
Existing General Plans	36.36	19.72	16.64
Prospective General Plans (2)	45.80	19.72	26.08
Constrained General Plans	29.46	19.72	9.74

(1) Based on sewer use estimates of 70 gpd per employee and 80 gpd per resident.

(2) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

Source: Economic and Planning Systems



**Table V-9**  
**Additional Sewage Export Requirements**  
**Given Projections of Employment and Population Potential**  
**For Each Jurisdiction in the TWA Service Area**

<b>Jurisdiction and Scenario (1)</b>	<b>Total Export Capacity Needed to Accomodate Growth (2) (MGD)</b>	<b>Existing Export Capacity (MGD)</b>	<b>Export Expansion Required to Accomodate Growth (MGD)</b>
<b>Pleasanton</b>			
Existing General Plans	11.656	7.106	4.550
Prospective General Plans (3)	12.062	7.106	4.956
<b>Livermore</b>			
Existing General Plans	14.718	8.229	6.489
Prospective General Plans	18.043	8.229	9.814
<b>DSRSD</b>			
Existing General Plans	9.983	4.385	5.598
Prospective General Plans	15.695	4.385	11.310
<b>Total</b>			
Existing General Plans	36.358	19.720	16.638
Prospective General Plans	45.800	19.720	26.080

(1) No allocation to jurisdiction has been made for the constrained General Plans Scenario, due to the complexity of factors that will determine where development occurs.

(2) Based on sewer use estimates of 70 gpd per employee and 80 gpd per resident.

(3) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

Source: Economic and Planning Systems





## VI. LAND USE POLICY IMPACTS AND MITIGATIONS

---

This section evaluates the land use policy impacts associated with alternative General Plan and sewer expansion scenarios. Land use policy impacts, in this instance, refers to the effects of alternative land use policies on the ability of the urban system to develop and function as intended. The land use patterns that result from General Plan policies and infrastructure capacities will, in turn, generate other impacts, including traffic and transportation, air and water quality, and noise. These impacts will be addressed in a supplemental EIR on the proposed sewer expansion.

### IMPACTS

The land use impacts of the project alternatives stem from the relationship between employment-generating and residential uses that could be developed in each instance. As shown in the foregoing sections of this report, the amount of residential land designated, together with the planned transportation system, will not support the levels of employment allowed under General Plan policies.

The imbalance between employment and housing has a variety of impacts. The principal impacts under each land use/sewer capacity scenario are described below.

#### EXISTING GENERAL PLANS SCENARIO

Under the existing General Plans Scenario, planned employment uses would be constrained by nearly 100,000 jobs. In other words, land designated for commercial/industrial uses that would support about 100,000 employees would be unlikely to be developed as designated due to labor force and transportation constraints. The land use impacts associated with this scenario are described below.

- **Lack of housing affordable to local workers.** The disproportionate allocation of land uses to non-residential development will result in an insufficient number of dwelling units relative to the potential employment base. The relative scarcity of residential land will put upward pressure on land and unit prices, making it less likely that affordable units will be developed.
- **Lack of sufficient labor force to support economic and fiscal development envisioned in General Plans.** The primary reasons for designating land for commercial/industrial uses is to encourage economic development and a strong fiscal base. The lack of sufficient housing resources to support planned commercial/industrial development means that cities will not be able to achieve the economic and fiscal goals set forth in their General Plans.



- **Overtaxing of highway system to support commute.** The lack of affordable housing will force workers, as it already has, to seek housing in outlying areas, and commute to jobs in the service area. Excessive reliance on commutation to supply labor to the Tri-Valley will strain the transportation network. Transportation demand is likely to increase until service levels deteriorate to the point that land use demand diminishes.
- **Commitment of land to untenable pattern of development.** If land committed to commercial/industrial development does not develop as planned due to constraints, redesignation of the land for other uses may result in a sub-optimal land use pattern. This may occur where infrastructure, surrounding uses and design guidelines appropriate to the untenable commercial/industrial uses have been implemented.
- **Possible financial jeopardy to assessment districts.** In cases where major financial commitments have been made in anticipation of commercial/industrial uses, the failure of these uses to materialize could result in financial failure of assessment districts and other financing mechanisms.
- **Disproportionate allocation of economic growth to communities where substantial growth has already occurred.** If economic growth is curtailed due to labor force and transportation constraints, the communities most impacted will be those that began their commercial/industrial expansion latest. More developed communities will wind up with larger economic and fiscal bases.

#### PROSPECTIVE GENERAL PLANS SCENARIO

The Prospective General Plans Scenario would, in effect, represent a partial mitigation of the Existing General Plans Scenario. The planned major additions to the housing supply would allow an additional increment of economic development to occur, reducing constrained employment from almost 100,000 jobs to about 47,000 jobs.

While the Prospective General Plans Scenario partially mitigates the impacts described above, it still results in an imbalance between employment and housing with all the attendant consequences. Therefore, the impacts of this scenario are essentially the same as those described for the Existing General Plan. The only difference is that it would allow a higher level of economic development to occur prior to reaching the labor force and transportation constraints.

#### CONSTRAINED GENERAL PLANS SCENARIO

The constrained General Plans Scenario would result in a balance between employment and housing, commensurate with the capacity of the transportation network. However, this scenario would represent a significant retrenchment from existing General Plan policies, and would have a number of land use impacts that raise important functional and equity issues. The impacts associated with this scenario are described below.





- **Disproportionate allocation of economic growth and fiscal benefits.** If constrained employment is apportioned on a pro rata basis, per General Plan capacities, areas where major commitments to public facilities have been made – such as the NPID in Pleasanton, for example -- would not be able to be developed fully. As a result, the financing for these areas could be put into jeopardy. Also, the alternative uses of the land may be less than optimal.

If, on the other hand, allocation of employment potential is made to reflect existing commitments, communities that are not as far along in their development -- such as Dublin, for example -- will have less opportunity to develop their employment base and fiscal foundation.

These points are illustrated by **Table VI-1**. If constrained employment potential were allocated proportionately, Pleasanton's employment potential would drop by about 26,000 jobs. This reduction is equivalent to the entire Hacienda Business Park, and would reduce the buildout of the NPID by about 30 percent. Such a reduction would have serious financial consequences. Further, it would be difficult to convert the land in the NPID to a rationale pattern of open space and residential uses, due to the configuration of existing uses and infrastructure.

If, on the other hand, employment capacity were allocated first to areas such as NPID, where commitments have already been made, the reduction in unrealized employment in that area would be at the expense of other jurisdictions. For example, if the unrealized employment under a proportional allocation in Pleasanton, 26,000 jobs, was allowed to develop, unrealized employment in Livermore and Dublin would increase by that amount.

- **Lack of flexibility in land use policies to allow more economic development.** Under the other two scenarios, the potential exists to convert commercial/industrial land to residential, thereby increasing the amount of economic development that could occur. Under the Constrained General Plans Scenario, the balance would be struck in advance, but at a lower level of economic potential, and flexibility for future land use policies would be diminished.
- **Fiscal competition could further diminish economic potential.** The preference for commercial development over residential uses due to fiscal considerations could lead to further rezoning of residential land to commercial, even after land use policies were adopted to eliminate the constrained employment in Existing General Plans. If that were to occur, housing resources would be reduced below the levels in the Existing General Plans, and employment potential would be reduced even below the constrained level.

## MITIGATIONS

As noted in the Background section, the Court is requiring that a variety of mitigation measures be discussed in the EIR. In requiring this discussion, the Court has recognized that TWA itself may not have the authority to implement the mitigation measures, but must nevertheless present them for public review.





**Table VI-1**  
**Impact of Constrained General Plans Scenario on Employment Growth**  
**Assuming a Pro-Rata Distribution of Future Job Growth**  
**By Jurisdiction in the TWA Service Area**

Jurisdiction and Use Type	1989	Existing General Plans Scenario	Marginal Growth to Buildout	Share of Future Growth By Type	Each Jurisdictions Share of Constrained Employment Growth (1)	Unrealized Employment
<b>Pleasanton</b>						
Population	51,956	75,100	23,144	27%		
Employment	30,900	80,700	49,800	26%	23,715	26,085
<b>Livermore</b>						
Population	56,820	87,300	30,480	35%		
Employment	26,045	110,500	84,455	45%	40,218	44,237
<b>DSRSD</b>						
Population	33,474	65,900	32,426	38%		
Employment	13,505	67,300	53,795	29%	25,617	28,178
<b>Total</b>						
Population	142,250	228,300	86,050	100%		
Employment	70,450	258,500	188,050	100%	89,550	98,500

(1) Each jurisdiction is allocated a share of the 89,550 future jobs in the constrained scenario based on the area's percentage share of unconstrained future employment growth.

Source: Economic and Planning Systems



Mitigation of the impacts described above depends on balancing land uses and transportation infrastructure. Fundamental to accomplishing this task is addressing the issues of growth at the level where functional interrelationships are determined. This means establishing land use and infrastructure policy at the subregional level (i.e., for the Tri-Valley area), and having some political means to implement effective policies.

Some possible actions that could be considered to mitigate land use policy impacts are described below. Eventually, the potential mitigation measures will need to be developed into specific programs that can be implemented and monitored to meet CEQA requirements. Further evaluation and hearings would be required before implementation of any of these possible actions.

The land uses that could occur under each General Plans Scenario would generate a number of environmental impacts, including traffic and transportation, air and water quality, and noise. These impacts and associated mitigations will be addressed in the forthcoming supplemental EIR.

The mitigation measures that have been identified to date include the following.

1. **ESTABLISH A GROWTH MONITORING AND MANAGEMENT PROGRAM** that coordinates land use and public facility planning on a subregional level to provide a balance among land uses, compatible with transportation and other infrastructure capacities. Elements of this program might include:
  - Develop coordinated goals and standards for Tri-Valley growth to be implemented and enforced through adoption in the General Plans of governmental entities within the TWA service area.
  - Rezone commercial/industrial land to residential to balance land uses and allow more economic growth.
  - Promote housing development that reflects the income distribution of the local employment base.
  - Develop a Master Infrastructure Financing Plan that identifies funding programs that can be supported by feasible land use development, and that pool resources from all jurisdictions within the subregion.
  - Encourage Transportation Systems Management (TSM) measures and transit improvements that would increase the capacity of the transportation system beyond projected levels.
2. **CREATE A JOINT POWERS AUTHORITY OR OTHER GOVERNMENTAL BODY** capable of addressing growth issues and policy at the subregional level, and implementing the above mitigation measures.



# ECONOMIC AND PLANNING SYSTEMS

---

## APPENDIX A

Growth Projections and Projected  
Sewer Capacity Utilization  
By Jurisdiction: 1989 - 2000





**Table A-1**  
**Growth Projections and Estimated Sewer Use**  
**Pleasanton**  
**1989 to 2000**

Category	End Of Calendar Year:											
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>New Dwelling Units (1)</b>												
Annual Increase	2,691	650	650	650	650	650	650	650	650	650	650	650
Cumulative	2,691	3,341	3,991	4,641	5,291	5,941	6,591	7,241	7,891	8,541	9,191	9,841
<b>New Residents (2)</b>												
Annual Increase	7,064	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706
Cumulative	7,064	8,770	10,476	12,183	13,889	15,595	17,301	19,008	20,714	22,420	24,126	25,833
<b>Residential Sewer Use (3)</b>												
Annual Increase	565,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000	137,000
Cumulative	565,000	702,000	839,000	976,000	1,113,000	1,250,000	1,387,000	1,524,000	1,661,000	1,798,000	1,935,000	2,072,000
<b>Employment Growth (4)</b>												
Annual Increase	2,851	1,803	1,899	2,001	2,108	1,288	1,328	1,370	1,412	1,456	1,501	1,547
Cumulative	2,851	4,654	6,553	8,554	10,662	11,950	13,279	14,649	16,061	17,516	19,017	20,565
<b>Nonresidential Sewer Use (5)</b>												
Annual Increase	200,000	126,000	133,000	140,000	148,000	90,000	93,000	96,000	99,000	102,000	105,000	108,000
Cumulative	200,000	326,000	459,000	599,000	747,000	837,000	930,000	1,026,000	1,125,000	1,227,000	1,332,000	1,440,000
<b>Total Sewer Use</b>												
Annual Increase	765,000	263,000	270,000	277,000	285,000	227,000	230,000	233,000	236,000	239,000	242,000	245,000
Cumulative	765,000	1,028,000	1,298,000	1,575,000	1,860,000	2,087,000	2,317,000	2,550,000	2,786,000	3,025,000	3,267,000	3,512,000
<b>Remaining Capacity</b>	1,846,000	1,583,000	1,313,000	1,036,000	751,000	524,000	294,000	61,000	(175,000)	(414,000)	(656,000)	(901,000)

(1) The 1989 growth projections include growth projected for the last four months of 1988.

(2) Assumes that the mix of units is 75% Single Family and 25% Multi-Family.

(3) Residential sewer use for average dry weather flow (ADWF) is assumed to be 220 gpd per SF unit and 180 gpd per MF unit.

(4) Assumes annual average growth rate of 5.34% from 1990-94 and 3.10% from 1995-99.

(5) Nonresidential sewer use for average dry weather flow (ADWF) is assumed to be 70 gpd per employee.

Sources: Pleasanton, Growth Management Report, 1989; Gruen Gruen + Associates; Economic and Planning Systems, Inc.



**Table A-2**  
**Growth Projections and Estimated Sewer Use**  
**Livermore**  
**1989 to 2000**

Category	End Of Calendar Year:											
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>New Dwelling Units (1)</b>												
Annual Increase	1,436	930	570	590	600	620	630	650	660	680	700	720
Cumulative	1,436	2,366	2,936	3,526	4,126	4,746	5,376	6,026	6,686	7,366	8,066	8,786
<b>New Residents (2)</b>												
Annual Increase	3,841	2,488	1,525	1,578	1,605	1,659	1,685	1,739	1,766	1,819	1,873	1,926
Cumulative	3,841	6,329	7,854	9,432	11,037	12,696	14,381	16,120	17,885	19,704	21,577	23,503
<b>Residential Sewer Use (3)</b>												
Annual Increase	307,000	199,000	122,000	126,000	128,000	133,000	135,000	139,000	141,000	146,000	150,000	154,000
Cumulative	307,000	506,000	628,000	754,000	882,000	1,015,000	1,150,000	1,289,000	1,430,000	1,576,000	1,726,000	1,880,000
<b>Employment Growth (4)</b>												
Annual Increase	1,542	1,634	1,730	1,833	1,941	1,357	1,411	1,466	1,523	1,582	1,644	1,709
Cumulative	1,542	3,176	4,906	6,739	8,680	10,038	11,448	12,914	14,437	16,019	17,664	19,372
<b>Nonresidential Sewer Use (5)</b>												
Annual Increase	108,000	114,000	121,000	128,000	136,000	95,000	99,000	103,000	107,000	111,000	115,000	120,000
Cumulative	108,000	222,000	343,000	471,000	607,000	702,000	801,000	904,000	1,011,000	1,122,000	1,237,000	1,357,000
<b>Total Sewer Use</b>												
Annual Increase	415,000	313,000	243,000	254,000	264,000	228,000	234,000	242,000	248,000	257,000	265,000	274,000
Cumulative	415,000	728,000	971,000	1,225,000	1,489,000	1,717,000	1,951,000	2,193,000	2,441,000	2,698,000	2,963,000	3,237,000
<b>Remaining Capacity</b>	2,814,000	2,501,000	2,258,000	2,004,000	1,740,000	1,512,000	1,278,000	1,036,000	788,000	531,000	266,000	(8,000)

(1) Assumes a 3.5 percent annual growth rate after 1990.

(2) Assumes that the mix of units is 85% Single Family and 15% Multi-Family.

(3) Residential sewer use for average dry weather flow (ADWF) is assumed to be 220 gpd per SF unit and 180 gpd per MF unit.

(4) Assumes annual average growth rate of 5.92% from 1990-94 and 3.91% from 1995-99.

(5) Nonresidential sewer use for average dry weather flow (ADWF) is assumed to be 70 gpd per employee.

Sources: City of Livermore; Gruen Gruen + Associates; Economic and Planning Systems, Inc.





**Table A-3**  
**Growth Projections and Estimated Sewer Use**  
**DSRSD**  
**1989 to 2000**

Category	End Of Calendar Year:											
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>New Dwelling Units</b>												
Annual Increase	200	350	350	350	350	350	600	600	600	600	600	600
Cumulative	200	550	900	1,250	1,600	1,950	2,550	3,150	3,750	4,350	4,950	5,550
<b>New Residents (1)</b>												
Annual Increase	535	936	936	936	936	936	1,605	1,605	1,605	1,605	1,605	1,605
Cumulative	535	1,471	2,408	3,344	4,280	5,216	6,821	8,426	10,031	11,636	13,241	14,846
<b>Residential Sewer Use (2)</b>												
Annual Increase	37,000	66,000	66,000	66,000	66,000	66,000	112,000	112,000	112,000	112,000	112,000	112,000
Cumulative	37,000	103,000	169,000	235,000	301,000	367,000	479,000	591,000	703,000	815,000	927,000	1,039,000
<b>Employment Growth (3)</b>												
Annual Increase	193	196	199	202	206	99	191	192	147	102	102	103
Cumulative	193	389	589	791	997	1,095	1,287	1,479	1,626	1,727	1,830	1,933
<b>Nonresidential Sewer Use (4)</b>												
Annual Increase	14,000	14,000	14,000	14,000	14,000	7,000	13,000	13,000	10,000	7,000	7,000	7,000
Cumulative	14,000	28,000	42,000	56,000	70,000	77,000	90,000	103,000	113,000	120,000	127,000	134,000
<b>Total Sewer Use</b>												
Annual Increase	51,000	80,000	80,000	80,000	80,000	73,000	125,000	125,000	122,000	119,000	119,000	119,000
Cumulative	51,000	131,000	211,000	291,000	371,000	444,000	569,000	694,000	816,000	935,000	1,054,000	1,173,000
<b>Remaining Capacity</b>	765,000	685,000	605,000	525,000	445,000	372,000	247,000	122,000	0	(119,000)	(238,000)	(357,000)

(1) Assumes that the mix of units is 75% Single Family and 25% Multi-Family.

(2) Residential sewer use for average dry weather flow (ADWF) is assumed to be 220 gpd per SF unit and 180 gpd per MF unit.

(3) For the City of Dublin, assumes annual average growth rate of 1.57% from 1990-94 and 0.74% from 1995-99.

For San Ramon, the projection is based on specific project information.

(4) Nonresidential sewer use for average dry weather flow (ADWF) is assumed to be 70 gpd per employee.

Sources: DSRSD; Gruen Gruen + Associates; Economic and Planning Systems, Inc.





# ECONOMIC AND PLANNING SYSTEMS

---

## **APPENDIX B**

### General Plan Land Use Potential For The Entire Tri-Valley



# GENERAL PLAN LAND USE POTENTIAL FOR THE ENTIRE TRI-VALLEY

---

The analysis of the total Tri-Valley outlined in this appendix is similar to that presented in Chapter V for the TWA Service Area. **Tables B-1 and B-2** outline the land use potential for the total Tri-Valley, by analysis area, under the two General Plan scenarios. **Table B-3** outlines the projected employment constraints for each scenario. **Table B-4** summarizes the results.





**Table B-1**  
**Land Use Potentials for the Existing General Plans**  
**By Analysis Area**  
**Total Tri-Valley**

Analysis Area	SF UNITS	MF UNITS	TOTAL UNITS	POPULATION (1)	EMPLOYMENT (2)
Alamo-Blackhawk	5,983	0	5,983	17,231	1,084
Danville	17,375	858	18,233	51,687	8,669
San Ramon	11,935	8,951	20,886	51,559	48,021
Tassajara & Dougherty Valleys	4,584	0	4,584	13,202	233
Dublin	4,477	4,133	8,610	20,829	11,346
East Dublin	0	2,500	2,500	4,800	54,287
West Dublin	0	0	0	0	0
Pleasanton	19,042	10,168	29,210	74,364	80,675
Pleasanton Ridge	259	0	259	745	0
Livermore (3)	23,760	6,427	30,187	80,763	92,769
North Livermore	2,248	6	2,254	6,487	17,780
<b>Total</b>	<b>89,663</b>	<b>33,043</b>	<b>122,706</b>	<b>321,667</b>	<b>314,864</b>

(1) Assumes a 4% vacancy rate, 3 persons per single family unit and 2 persons per multi-family unit.

(2) Assumes a 5% vacancy rate and the following employment densities (employees per square feet of building space):  
 Retail-510; Office-260; Service-490; Industrial-590; Motel-1,060; R&D-360; Restaurant-175; Warehouse-1,300.

(3) Includes Springtown.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.



**Table B-2**  
**Land Use Potentials for the Prospective General Plans Scenario (1)**  
**By Analysis Area**  
**Total Tri-Valley**

Analysis Area	SF UNITS	MF UNITS	TOTAL UNITS	POPULATION (2)	EMPLOYMENT (3)
Alamo-Blackhawk	5,983	0	5,983	17,231	1,084
Danville	17,375	858	18,233	51,687	8,669
San Ramon	11,935	8,951	20,886	51,559	48,021
Tassajara & Dougherty Valleys	8,585	11,985	20,570	47,736	4,000
Dublin	4,477	4,133	8,610	20,829	11,346
East Dublin	4,500	10,500	15,000	33,120	46,192
West Dublin	2,843	1,600	4,443	11,259	1,228
Pleasanton	19,042	10,168	29,210	74,364	80,675
Pleasanton Ridge	2,020	0	2,020	5,817	0
Livermore (4)	23,760	6,427	30,187	80,763	92,769
North Livermore	14,030	3,972	18,002	48,032	17,800
<b>Total</b>	<b>114,550</b>	<b>58,594</b>	<b>173,144</b>	<b>442,397</b>	<b>311,784</b>

(1) Includes existing General Plans plus amendments for major planning areas where the planning process has been initiated.

(2) Assumes a 4% vacancy rate, 3 persons per single family unit and 2 persons per multi-family unit.

(3) Assumes a 5% vacancy rate and the following employment densities (employees per square feet of building space):

Retail-510; Office-260; Service-490; Industrial-590; Motel-1,060; R&D-360; Restaurant-175; Warehouse-1,300.

(4) Includes Springtown.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.



**Table B-3**

**Projections of Tri-Valley Employment and Population Potential, Given Commutation Constraints  
Buildout of Existing General Plan and Prospective General Plans Scenarios  
Total Tri-Valley**

<b>Category</b>	<b>Existing General Plans</b>	<b>Prospective General Plans Scenario (1)</b>
<b>Households in the Tri-Valley</b>	122,700	173,100
<b>Population in the Tri-Valley</b>	321,700	442,400
<b>Labor Force in the Tri-Valley (2)</b>	196,300	277,000
<b>Tri-Valley Residents Employed in the Tri-Valley (3)</b>	117,800	166,200
<b>Employees that Commute Into the Tri-Valley (4)</b>	92,300	92,300
<b>Potential Employment Given Commutation Constraints (Sum of Two Previous Lines)</b>	210,100	258,500
<b>General Plan Employment Potential in the Tri-Valley</b>	314,900	311,800
<b>Employment Potential Not Realized Due to Commutation Constraints</b>	104,800	53,300

(1) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

(2) Workers Per Household: 1.60

(3) Percentage of Tri-Valley Residents who work in Tri-Valley as of Buildout: 60%

(4) Based on analysis of existing use and capacity of the gateways. See Table V-5.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.





**Table B-4****Projections of Tri-Valley Employment and Population Potential  
Summary of Results For All Scenarios  
Total Tri-Valley**

<b>Scenario</b>	<b>Total Population</b>	<b>Total Employment</b>	<b>Constrained Employment (1)</b>
<b>1989 Existing Conditions</b>	212,225	99,850	NA
<b><u>No Constraints</u></b>			
Existing General Plans	321,700	314,900	NA
Prospective General Plans (3)	442,400	311,800	NA
<b><u>Commutation Constraints</u></b>			
Existing General Plans	321,700	210,100	104,800
Prospective General Plans (3)	442,400	258,500	53,300

NA= Not Applicable.

(1) Employment potential not realized due to traffic constraints. See Table A-3 for detail.

(2) Includes development in Pleasanton Ridge, East Dublin, West Dublin and Tassajara Valley.

(3) Includes General Plan Amendments in North Livermore, Pleasanton Ridge, East Dublin, West Dublin and Tassajara and Dougherty Valleys.

Sources: General Plans of Tri-Valley Cities; TJKM; Economic and Planning Systems.





U.C. BERKELEY LIBRARIES



C124904553



